



SEQUENCE LISTING

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<120> Everninomicin Biosynthetic Genes

<130> ID0983K US

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<141> 2001-01-11

<150> US 60/175,751

<151> 2000-01-12

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<170> PatentIn Ver. 2.1

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35 40 45

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Thr Val Ser Asn Thr Ala Ala Pro Thr Val Leu Ala Ile Asp Ala Val	
85 90 95	
ggc gcg acg ccg gtc ttc gtg gac gtc cgc gcc gac gac tac ctg atg 336	
Gly Ala Thr Pro Val Phe Val Asp Val Arg Ala Asp Asp Tyr Leu Met	
100 105 110	
gac acc gag ctg ctg gcc gag gcg gtc acc ccc ccg acg aag gcg ctg 384	
Asp Thr Glu Leu Leu Ala Glu Ala Val Thr Pro Arg Thr Lys Ala Leu	
115 120 125	
ctg ccg gtg cac ctc tac ggc cag tgc gtc gac atg gac ccg gtg ctg 432	
Leu Pro Val His Leu Tyr Gly Gln Cys Val Asp Met Asp Pro Val Leu	
130 135 140	
cgg gtg gcc ccg gaa cac ggc ctc aag gtc ctg gag gac tgc gcg cag 480	
Arg Val Ala Arg Glu His Gly Leu Lys Val Leu Glu Asp Cys Ala Gln	
145 150 155 160	
tcg cac ggc gcg cgt ccg ggc gga ccg ctg gcc ggc acg atg ggc gac 528	
Ser His Gly Ala Arg Arg Gly Gly Arg Leu Ala Gly Thr Met Gly Asp	
165 170 175	
gcc gct gcc ttc tcg ttc tat ccg acg aag gtg ctg ggc gcg tac ggc 576	
Ala Ala Ala Phe Ser Phe Tyr Pro Thr Lys Val Leu Gly Ala Tyr Gly	
180 185 190	
gac ggc ggc ggc gtg gtc acc gcg gac gcc gtg atc gac gag ccg ctg 624	
Asp Gly Gly Gly Val Val Thr Ala Asp Ala Val Ile Asp Glu Arg Leu	
195 200 205	
cgg ccg ctg cgc tac tac ggc atg gaa cag gtc tac tac gtc gtc gag 672	
Arg Arg Leu Arg Tyr Tyr Gly Met Glu Gln Val Tyr Tyr Val Val Glu	
210 215 220	
acg ccg ggg cac aac tgc cgc ctc gac gag gtg cag gcc gag atc ctg 720	
Thr Pro Gly His Asn Cys Arg Leu Asp Glu Val Gln Ala Glu Ile Leu	
225 230 235 240	
cgc cgc aag ctg tgc ccg ctc gac gac tac atc gcc ggg cgc cgc gcc 768	
Arg Arg Lys Leu Cys Arg Leu Asp Asp Tyr Ile Ala Gly Arg Arg Ala	
245 250 255	
gtg gcc ccg cgc tac gag gag ggc ctg gcc gac atc gcc gac cag gtc 816	

Leu Pro Val His Leu Tyr Gly Gln Cys Val Asp Met Asp Pro Val Leu
 130 135 140
 Arg Val Ala Arg Glu His Gly Leu Lys Val Leu Glu Asp Cys Ala Gln
 145 150 155 160
 Ser His Gly Ala Arg Arg Gly Gly Arg Leu Ala Gly Thr Met Gly Asp
 165 170 175
 Ala Ala Ala Phe Ser Phe Tyr Pro Thr Lys Val Leu Gly Ala Tyr Gly
 180 185 190
 Asp Gly Gly Gly Val Val Thr Ala Asp Ala Val Ile Asp Glu Arg Leu
 195 200 205
 Arg Arg Leu Arg Tyr Tyr Gly Met Glu Gln Val Tyr Tyr Val Val Glu
 210 215 220
 Thr Pro Gly His Asn Cys Arg Leu Asp Glu Val Gln Ala Glu Ile Leu
 225 230 235 240
 Arg Arg Lys Leu Cys Arg Leu Asp Asp Tyr Ile Ala Gly Arg Arg Ala
 245 250 255
 Val Ala Arg Arg Tyr Glu Glu Gly Leu Ala Asp Ile Ala Asp Gln Val
 260 265 270
 Gly Leu Thr Leu Pro Val Thr Ala Thr Asp Asn Glu His Val Trp Tyr
 275 280 285
 Val Tyr Val Val Arg His Pro Ala Arg Asp Arg Ile Leu Glu Gln Leu
 290 295 300
 Ala Ala Arg Asp Ile Ala Leu Asn Ile Ser Tyr Pro Trp Pro Val His
 305 310 315 320
 Thr Met Thr Gly Phe Ala Lys Leu Gly Tyr Gln Thr Gly Ser Leu Pro
 325 330 335
 Thr Thr Glu Arg Leu Ala Gly Glu Ile Phe Ser Leu Pro Met Tyr Pro
 340 345 350
 Ser Leu Pro Pro Glu Thr Gln Asp Arg Val Ile Asp Ala Leu Arg Asp
 355 360 365
 Val Leu Ala Ala Leu
 370

<210> 6
 <211> 1236
 <212> DNA
 <213> Micromonospora carbonacea

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 <222> (1)..(1236)

<220>
 <223> evdC

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 Val Ala Ala Asp Leu Arg Ala Pro Leu Thr Pro Ala Gly Arg Thr Val

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gtc Val	gac Asp	ctg Leu	ctt Leu 20	gcc Ala	ggc Gly	gtg Val	atc Ile	ccg Pro 25	aga Arg	atc Ile	agt Ser	gcg Ala	gag Glu 30	gcc Ala	gcc Ala	96
gac Asp	cgg Arg	gac Asp 35	cgc Arg	acc Thr	ggc Gly	acc Thr	ttc Phe 40	ccg Pro	gtg Val	gag Glu	gcg Ala	ttc Phe 45	gag Glu	cag Gln	ttc Phe	144
gcg Ala	aag Lys 50	ctc Leu	ggg Gly	ttg Leu	atg Met	ggc Gly 55	gcc Ala	acc Thr	gtt Val	ccc Pro	gcc Ala 60	gag Glu	ctg Leu	ggc Gly	ggc Gly	192
ctg Leu 65	ggg Gly	ttg Leu	acc Thr	cgg Arg	ctg Leu 70	tac Tyr	gac Asp	gtg Val	gcg Ala	acc Thr 75	gcg Ala	ctg Leu	atg Met	cgg Arg	ctg Leu 80	240
gcc Ala	gag Glu	gcc Ala	gac Asp	gcg Ala 85	tcc Ser	acc Thr	gcg Ala	ctg Leu 90	gcc Ala	tgg Trp	cac His	gtg Val	cag Gln	ctc Leu 95	agc Ser	288
cgg Arg	ggc Gly	ctc Leu	acc Thr 100	ctc Leu	acc Thr	tac Tyr	gag Glu	tgg Trp 105	cag Gln	cac His	ggc Gly	acg Thr	ccg Pro 110	ccg Pro	gtg Val	336
cgc Arg	gcg Ala	atg Met 115	gcg Ala	gag Glu	cgg Arg	ctg Leu 120	ctg Leu	cgg Arg	gcg Ala	atg Met	gcg Ala 125	gag Glu	ggc Gly	gag Glu	gcc Ala	384
gcc Ala 130	gtc Val	tgc Cys	ggc Gly	gcg Ala	ctc Leu	aag Lys 135	gac Asp	gcc Ala	ccc Pro	ggc Gly	gtg Val 140	gtc Val	acc Thr	gag Glu	ctg Leu	432
cat His 145	tcc Ser	gac Asp	ggc Gly	gcc Ala	ggc Gly 150	ggc Gly	tgg Trp	ctg Leu	ctg Leu	tcg Ser 155	ggc Gly	cgc Arg	aag Lys	gtg Val	ctg Leu 160	480
gtc Val	agc Ser	atg Met	gcg Ala	ccc Pro 165	atc Ile	gcg Ala	acc Thr	cac His	ttc Phe 170	ttc Phe	gtg Val	cac His	gcc Ala	cag Gln 175	cgg Arg	528
cgc Arg	gac Asp	gac Asp	gac Asp 180	ggc Gly	tcg Ser	gtg Val	ttc Phe	ctc Leu 185	gcc Ala	gtg Val	ccg Pro	gtc Val	gtg Val 190	cac His	cgc Arg	576
gac Asp	gcc Ala	ccc Pro 195	ggg Gly	ctc Leu	acg Thr	gtg Val	ctg Leu 200	gac Asp	aac Asn	tgg Trp	gac Asp	ggc Gly 205	ctg Leu	gga Gly	atg Met	624
cgt Arg	gcc Ala 210	tcg Ser	ggg Gly	acg Thr	ctg Leu	gag Glu 215	gtg Val	gtc Val	ttc Phe	gac Asp	cgg Arg 220	tgc Cys	ccg Pro	gtc Val	cgg Arg	672
gcc Ala 225	gac Asp	gag Glu	ctg Leu	ctg Leu 230	gag Glu	cgc Arg	ggc Gly	ccg Pro	gtc Val	ggg Gly 235	gcc Ala	cgg Arg	cgg Arg	gac Asp	gcc Ala 240	720
gtg Val	ctg Leu	gcc Ala	ggg Gly 245	cag Gln	acg Thr	gtc Val	agc Ser	tcg Ser	atc Ile 250	acc Thr	atg Met	ctc Leu	ggc Gly	atc Ile 255	tac Tyr	768
gcc Ala	ggc Gly	atc Ile	gcc Ala 260	cag Gln	gcg Ala	gcc Ala	cgg Arg	gac Asp 265	atc Ile	gcg Ala	gtc Val	ggt Gly	ttc Phe 270	tgc Cys	gcg Ala	816

ggg cgc ggc ggc gag cca cgg gcc ggt gcc cgg gcg ctg gtc gcc ggg 864
 Gly Arg Gly Gly Glu Pro Arg Ala Gly Ala Arg Ala Leu Val Ala Gly
 275 280 285
 ctg gac acc cgg ctc tac gcg cta cgc acc acg gtc ggc gcg gcg ttg 912
 Leu Asp Thr Arg Leu Tyr Ala Leu Arg Thr Thr Val Gly Ala Ala Leu
 290 295 300
 acc aac gcc gac gcg gcg tcg gtc gac ctg tcc ggc gac ccg gac gaa 960
 Thr Asn Ala Asp Ala Ala Ser Val Asp Leu Ser Gly Asp Pro Asp Glu
 305 310 315 320
 cgc ggc cga cgg atg atg acc ccg ttc cag tac gcg aag atg acc gtc 1008
 Arg Gly Arg Arg Met Met Thr Pro Phe Gln Tyr Ala Lys Met Thr Val
 325 330 335
 aac gag ctg gcc ccg gcg gtg gtg gac gac tgc ctc agc ctg gtc ggc 1056
 Asn Glu Leu Ala Pro Ala Val Val Asp Asp Cys Leu Ser Leu Val Gly
 340 345 350
 ggc ctc gcc tac acg gcc ggg cac cca ctc tcc cgg ctc tat cgc gac 1104
 Gly Leu Ala Tyr Thr Ala Gly His Pro Leu Ser Arg Leu Tyr Arg Asp
 355 360 365
 gtg cgg gcc ggc ggg ttc atg cag ccc tac agc tac gtg gac gcc gtc 1152
 Val Arg Ala Gly Gly Phe Met Gln Pro Tyr Ser Tyr Val Asp Ala Val
 370 375 380
 gac tac ctg agc ggt cag gca ctt gga ctc gac cgg gac aac gac tac 1200
 Asp Tyr Leu Ser Gly Gln Ala Leu Gly Leu Asp Arg Asp Asn Asp Tyr
 385 390 395 400
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 Met Ser Val Arg Ala Leu Arg Ser Arg Thr Ser Ala
 405 410

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 <212> PRT
 <213> Micromonospora carbonacea

<220>
 <223> evdC

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 Asp Arg Asp Arg Thr Gly Thr Phe Pro Val Glu Ala Phe Glu Gln Phe
 35 40 45
 Ala Lys Leu Gly Leu Met Gly Ala Thr Val Pro Ala Glu Leu Gly Gly
 50 55 60
 Leu Gly Leu Thr Arg Leu Tyr Asp Val Ala Thr Ala Leu Met Arg Leu
 65 70 75 80
 Ala Glu Ala Asp Ala Ser Thr Ala Leu Ala Trp His Val Gln Leu Ser
 85 90 95

Arg	Gly	Leu	Thr 100	Leu	Thr	Tyr	Glu	Trp	Gln	His	Gly	Thr	Pro	Pro	Val
Arg	Ala	Met 115	Ala	Glu	Arg	Leu	Leu 120	Arg	Ala	Met	Ala	Glu 125	Gly	Glu	Ala
Ala	Val	Cys 130	Gly	Ala	Leu	Lys 135	Asp	Ala	Pro	Gly	Val 140	Val	Thr	Glu	Leu
His 145	Ser	Asp	Gly	Ala	Gly 150	Gly	Trp	Leu	Leu	Ser 155	Gly	Arg	Lys	Val	Leu 160
Val	Ser	Met	Ala	Pro 165	Ile	Ala	Thr	His	Phe 170	Phe	Val	His	Ala	Gln 175	Arg
Arg	Asp	Asp	Asp 180	Gly	Ser	Val	Phe	Leu 185	Ala	Val	Pro	Val	Val 190	His	Arg
Asp	Ala	Pro 195	Gly	Leu	Thr	Val	Leu 200	Asp	Asn	Trp	Asp	Gly 205	Leu	Gly	Met
Arg	Ala	Ser	Gly	Thr	Leu	Glu 215	Val	Val	Phe	Asp	Arg 220	Cys	Pro	Val	Arg
Ala 225	Asp	Glu	Leu	Leu	Glu 230	Arg	Gly	Pro	Val	Gly 235	Ala	Arg	Arg	Asp	Ala 240
Val	Leu	Ala	Gly	Gln 245	Thr	Val	Ser	Ser	Ile 250	Thr	Met	Leu	Gly	Ile 255	Tyr
Ala	Gly	Ile	Ala 260	Gln	Ala	Ala	Arg	Asp 265	Ile	Ala	Val	Gly	Phe 270	Cys	Ala
Gly	Arg	Gly 275	Gly	Glu	Pro	Arg	Ala 280	Gly	Ala	Arg	Ala	Leu 285	Val	Ala	Gly
Leu	Asp 290	Thr	Arg	Leu	Tyr	Ala 295	Leu	Arg	Thr	Thr	Val 300	Gly	Ala	Ala	Leu
Thr 305	Asn	Ala	Asp	Ala	Ala 310	Ser	Val	Asp	Leu	Ser 315	Gly	Asp	Pro	Asp	Glu 320
Arg	Gly	Arg	Arg	Met 325	Met	Thr	Pro	Phe	Gln 330	Tyr	Ala	Lys	Met	Thr 335	Val
Asn	Glu	Leu	Ala 340	Pro	Ala	Val	Val	Asp 345	Asp	Cys	Leu	Ser	Leu 350	Val	Gly
Gly	Leu	Ala 355	Tyr	Thr	Ala	Gly	His 360	Pro	Leu	Ser	Arg	Leu 365	Tyr	Arg	Asp
Val	Arg 370	Ala	Gly	Gly	Phe	Met 375	Gln	Pro	Tyr	Ser	Tyr 380	Val	Asp	Ala	Val
Asp 385	Tyr	Leu	Ser	Gly	Gln 390	Ala	Leu	Gly	Leu	Asp 395	Arg	Asp	Asn	Asp	Tyr 400
Met	Ser	Val	Arg	Ala 405	Leu	Arg	Ser	Arg	Thr 410	Ser	Ala				

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<212>	DNA

<213> Micromonospora carbonacea

<220>

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<222> (1)..(1167)

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<223> evdD

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1 5 10 15	
ctg gcc cca ctg gca atc gcc gcc cgg atg agc ggg cac gag gtc gtg	96
Leu Ala Pro Leu Ala Ile Ala Ala Arg Met Ser Gly His Glu Val Val	
20 25 30	
atg gct tcc acg cag gag gtc gta ccg gcg acg atg tcc gtc ggg ctg	144
Met Ala Ser Thr Gln Glu Val Val Pro Ala Thr Met Ser Val Gly Leu	
35 40 45	
ccg gcc ttc ccg ctg gcg gcg ctg acc ctc gcc gag ctc atg acc acc	192
Pro Ala Phe Pro Leu Ala Ala Leu Thr Leu Ala Glu Leu Met Thr Thr	
50 55 60	
gac cgg gcc ggc gat ccg ctg cgc atc ccg gcc gag gac gcc gcc ttc	240
Asp Arg Ala Gly Asp Pro Leu Arg Ile Pro Ala Glu Asp Ala Ala Phe	
65 70 75 80	
gtc ccc ttc gtc ggc cgg atg ttc ggc cgg ctg gcg gcg atc agc ctg	288
Val Pro Phe Val Gly Arg Met Phe Gly Arg Leu Ala Ala Ile Ser Leu	
85 90 95	
gat ccg ctg cgc gac ctg gtc ggc ggg tgg ccg ccc gac ctg atc gtc	336
Asp Pro Leu Arg Asp Leu Val Gly Gly Trp Arg Pro Asp Leu Ile Val	
100 105 110	
ggc ggc ccg cac gcc tac gcc gcg ccg atc ctg gcc acc gaa ctt ggg	384
Gly Gly Pro His Ala Tyr Ala Ala Pro Ile Leu Ala Thr Glu Leu Gly	
115 120 125	
gtg ccc tgc gtg cgg cac ctg ctc acc ggc aac ccg gtg gac cgc gag	432
Val Pro Cys Val Arg His Leu Leu Thr Gly Asn Pro Val Asp Arg Glu	
130 135 140	
ggc acc cat ccg ggg gtc gac gag gag ctg ccg ccg gag ctg gcc gcg	480
Gly Thr His Pro Gly Val Asp Glu Glu Leu Arg Pro Glu Leu Ala Ala	
145 150 155 160	
ctc ggc ctg gcc cag gtg ccg ccg ttc cac ctg gcc ctg gac atc ttc	528
Leu Gly Leu Ala Gln Val Pro Pro Phe His Leu Ala Leu Asp Ile Phe	
165 170 175	
ccg gcc agc acc cgg atc gac gac gtc ccg ccg gcg cag ccg gtg cga	576
Pro Ala Ser Thr Arg Ile Asp Asp Val Pro Pro Ala Gln Pro Val Arg	
180 185 190	
ccg ctg cgc tgg att ccg acc aac cag cag cag ccg gtg gcg ccg tgg	624
Pro Leu Arg Trp Ile Pro Thr Asn Gln Gln Gln Pro Val Ala Pro Trp	
195 200 205	
atg ctc tcg cgc ggg ccg cgt cgc cgt gtc ctg gtc acc gcc ggc agt	672
Met Leu Ser Arg Gly Pro Arg Arg Arg Val Leu Val Thr Ala Gly Ser	
210 215 220	

ctg gtc acc acc acc cac aac ttc gac ttc ctc cac gga ctg gcc ggc 720
 Leu Val Thr Thr Thr His Asn Phe Asp Phe Leu His Gly Leu Ala Gly 240
 225 230 235

acc ctg gcc gag cag gac gtc gag gtc gtg gtc gcg gcg ccg ccg gag 768
 Thr Leu Ala Glu Gln Asp Val Glu Val Val Val Ala Ala Pro Pro Glu 255
 245 250

gtg ggt cgg gcc ctg cac gac gtg ccg ggt gtg cgg cac gcc ggc tgg 816
 Val Gly Arg Ala Leu His Asp Val Pro Gly Val Arg His Ala Gly Trp 270
 260 265

ctc ccg ctg gac gtg gtg ctg ccc cac tgt gac ctg atc gtg cac cac 864
 Leu Pro Leu Asp Val Val Leu Pro His Cys Asp Leu Ile Val His His 285
 275 280

tcc ggc acg atg acc gcg ctg acc gcc ttg aac gcg ggg gtg ccc cag 912
 Ser Gly Thr Met Thr Ala Leu Thr Ala Leu Asn Ala Gly Val Pro Gln 300
 290 295

ctg atc gtg ccg cag gag agc ccg ttc atc gag tgg gcg cgc aac ctg 960
 Leu Ile Val Pro Gln Glu Ser Arg Phe Ile Glu Trp Ala Arg Asn Leu 320
 305 310 315

tcg acc ctg ggc gtg gcg cag acc ctc gcg ccg ggc gag gac acg ccg 1008
 Ser Thr Leu Gly Val Ala Gln Thr Leu Ala Pro Gly Glu Asp Thr Pro 335
 325 330

gag gcc gtg ggc aag gtc gcc cgc ctg ctg ctg gag gat ccg gtc cac 1056
 Glu Ala Val Gly Lys Val Ala Arg Leu Leu Leu Glu Asp Pro Val His 350
 340 345

gcc acc agc gcc gcc gcg atc gcc ccg gag atc gcc gag atg ccc ggc 1104
 Ala Thr Ser Ala Ala Ala Ile Ala Arg Glu Ile Ala Glu Met Pro Gly 365
 355 360

ccc acg gag gtc gtg ggc cag ctc acc gag ttc gcg acc ccg ggc ctg 1152
 Pro Thr Glu Val Val Gly Gln Leu Thr Glu Phe Ala Thr Arg Gly Leu 380
 370 375

aca tgc gcg tcc tcg 1167
 Thr Cys Ala Ser Ser 385

<210> 9

<211> 389

<212> PRT

<213> Micromonospora carbonacea

<220>

<223> evdD

<400> 9

Val Lys Ile Leu Phe Ile Ala Gly Pro Thr Lys Ser Ser Leu Phe Gly
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Leu Ala Pro Leu Ala Ile Ala Ala Arg Met Ser Gly His Glu Val Val
 20 25 30

Met Ala Ser Thr Gln Glu Val Val Pro Ala Thr Met Ser Val Gly Leu
 35 40 45

Pro Ala Phe Pro Leu Ala Ala Leu Thr Leu Ala Glu Leu Met Thr Thr

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 <212> DNA
 <213> *Micromonospora carbonacea*

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 <222> (1) .. (924)

<220>
 <223> evdE

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 1 5 10 15

ctc gaa cgc ggc gac agc gtc acc gtg ctc gac gac ctg tcc acc ggg 96
 Leu Glu Arg Gly Asp Ser Val Thr Val Leu Asp Asp Leu Ser Thr Gly
 20 25 30

cgg ccc gag cgg ctg ccc gcc ggg gtg ccg ctg cac cac ggg tcg atc 144
 Arg Pro Glu Arg Leu Pro Ala Gly Val Pro Leu His His Gly Ser Ile
 35 40 45

acc gac cgg gcc ggg ttg acc cgg ctg gcc gag cag tgt cgc ccg gag 192
 Thr Asp Arg Ala Gly Leu Thr Arg Leu Ala Glu Gln Cys Arg Pro Glu
 50 55 60

gtc atc tgc cac ctg gcc gcc cag gcg gac gtg cgc aac tcg gtg gcc 240
 Val Ile Cys His Leu Ala Ala Gln Ala Asp Val Arg Asn Ser Val Ala
 65 70 75 80

gac gcc acc tcg gac acc ggg gtc aac gtg gtc ggc acc gtc aac gtc 288
 Asp Ala Thr Ser Asp Thr Gly Val Asn Val Val Gly Thr Val Asn Val
 85 90 95

ctg gag gcc gcc cgg gcc atc gac gcc cgg gtg gtc ttc gcc tcc agc 336
 Leu Glu Ala Ala Arg Ala Ile Asp Ala Arg Val Val Phe Ala Ser Ser
 100 105 110

ggc ggc gcc ctc tac ggg gag gtc gac gag ctg ccc tcc ccc gag gac 384
 Gly Gly Ala Leu Tyr Gly Glu Val Asp Glu Leu Pro Ser Pro Glu Asp
 115 120 125

gtc cgg ccg gcg ccg tgg gcg ccg tac ggg gcc gcc aag tac tgc gcg 432
 Val Arg Pro Ala Pro Trp Ala Pro Tyr Gly Ala Ala Lys Tyr Cys Ala
 130 135 140

gag cag tac ctg gcg ctc tac aac cgg ctc tac ggc tcg acc cac gcg 480
 Glu Gln Tyr Leu Ala Leu Tyr Asn Arg Leu Tyr Gly Ser Thr His Ala
 145 150 155 160

gcg ctg cgg ctc ggc aac gtg tac ggg cca cgc cag gac ccg acc ggc 528
 Ala Leu Arg Leu Gly Asn Val Tyr Gly Pro Arg Gln Asp Pro Thr Gly
 165 170 175

gag gcc ggg gtc gtc tcg atc ttc tgc ggc tgc ctg gtg gcc ggg cgc 576
 Glu Ala Gly Val Val Ser Ile Phe Cys Gly Cys Leu Val Ala Gly Arg
 180 185 190

cgg ccg acg gtg ttc ggc gac ggc gag cag acc cgg gac tac atc tac 624
 Arg Pro Thr Val Phe Gly Asp Gly Glu Gln Thr Arg Asp Tyr Ile Tyr

195					200					205						
gtg	gcc	gac	gtg	gtg	gag	gcg	ttc	ctg	ctc	gcg	gtc	ggg	cac	ggg	ggc	672
Val	Ala	Asp	Val	Val	Glu	Ala	Phe	Leu	Leu	Ala	Val	Gly	His	Gly	Gly	
	210					215					220					
ccc	ggc	ctg	tgg	aac	atc	ggc	acc	ggg	acc	tcc	acc	agc	atc	cgc	aaa	720
Pro	Gly	Leu	Trp	Asn	Ile	Gly	Thr	Gly	Thr	Ser	Thr	Ser	Ile	Arg	Lys	
225					230					235					240	
cta	ctg	gac	ctg	gtc	ggc	cgc	acc	gcc	ggg	cgc	gtc	ccg	gac	ccc	cgc	768
Leu	Leu	Asp	Leu	Val	Gly	Arg	Thr	Ala	Gly	Arg	Val	Pro	Asp	Pro	Arg	
				245					250					255		
ttc	gag	cca	ccc	cgc	ctg	ggc	gag	ctg	aag	cac	tcc	gcg	ctg	gag	gtg	816
Phe	Glu	Pro	Pro	Arg	Leu	Gly	Glu	Leu	Lys	His	Ser	Ala	Leu	Glu	Val	
			260				265						270			
acc	cgc	gcg	gcc	cgg	gag	ctg	cgc	tgg	gcg	gcc	cga	acg	agg	ctc	gcc	864
Thr	Arg	Ala	Ala	Arg	Glu	Leu	Arg	Trp	Ala	Ala	Arg	Thr	Arg	Leu	Ala	
		275					280					285				
gac	ggc	atc	gcg	aag	gtc	tac	aag	tgg	gtc	gag	gcg	gac	gaa	ccg	gtc	912
Asp	Gly	Ile	Ala	Lys	Val	Tyr	Lys	Trp	Val	Glu	Ala	Asp	Glu	Pro	Val	
	290					295					300					
cgg	ggg	gag	cga													924
Arg	Gly	Glu	Arg													
305																

<210> 11
 <211> 308
 <212> PRT
 <213> Micromonospora carbonacea

<220>
 <223> evdE

<400> 11
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 20 25 30
 Arg Pro Glu Arg Leu Pro Ala Gly Val Pro Leu His His Gly Ser Ile
 35 40 45
 Thr Asp Arg Ala Gly Leu Thr Arg Leu Ala Glu Gln Cys Arg Pro Glu
 50 55 60
 Val Ile Cys His Leu Ala Ala Gln Ala Asp Val Arg Asn Ser Val Ala
 65 70 75 80
 Asp Ala Thr Ser Asp Thr Gly Val Asn Val Val Gly Thr Val Asn Val
 85 90 95
 Leu Glu Ala Ala Arg Ala Ile Asp Ala Arg Val Val Phe Ala Ser Ser
 100 105 110
 Gly Gly Ala Leu Tyr Gly Glu Val Asp Glu Leu Pro Ser Pro Glu Asp
 115 120 125
 Val Arg Pro Ala Pro Trp Ala Pro Tyr Gly Ala Ala Lys Tyr Cys Ala

130		135		140	
Glu Gln Tyr Leu Ala	Leu Tyr Asn Arg Leu Tyr Gly Ser Thr His Ala				
145	150	155			160
Ala Leu Arg Leu Gly	Asn Val Tyr Gly Pro Arg Gln Asp Pro Thr Gly				
	165	170			175
Glu Ala Gly Val Val Ser Ile Phe Cys Gly Cys Leu Val Ala Gly Arg					
	180	185			190
Arg Pro Thr Val Phe Gly Asp Gly Glu Gln Thr Arg Asp Tyr Ile Tyr					
	195	200			205
Val Ala Asp Val Val Glu Ala Phe Leu Leu Ala Val Gly His Gly Gly					
	210	215			220
Pro Gly Leu Trp Asn Ile Gly Thr Gly Thr Ser Thr Ser Ile Arg Lys					
	225	230			235
Leu Leu Asp Leu Val Gly Arg Thr Ala Gly Arg Val Pro Asp Pro Arg					
	245	250			255
Phe Glu Pro Pro Arg Leu Gly Glu Leu Lys His Ser Ala Leu Glu Val					
	260	265			270
Thr Arg Ala Ala Arg Glu Leu Arg Trp Ala Ala Arg Thr Arg Leu Ala					
	275	280			285
Asp Gly Ile Ala Lys Val Tyr Lys Trp Val Glu Ala Asp Glu Pro Val					
	290	295			300
Arg Gly Glu Arg					
305					

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 <211> 1041
 <212> DNA
 <213> Micromonospora carbonacea

<220>
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 <222> (1)..(1041)

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gtc ggc acc aac gag atc cgt tgg ctg gac cgc gcg ctc ggc tcg ctg		96
Val Gly Thr Asn Glu Ile Arg Trp Leu Asp Arg Ala Leu Gly Ser Leu		
20 25 30		
ctc gcc agc gac acg acc ggc ttc gag ctg acg gtc ttc tac gtg gac		144
Leu Ala Ser Asp Thr Thr Gly Phe Glu Leu Thr Val Phe Tyr Val Asp		
35 40 45		
aac gcc tcg gcc gac ggc agc gtg gcg cac gtc atg tcg gcg ttt ccc		192
Asn Ala Ser Ala Asp Gly Ser Val Ala His Val Met Ser Ala Phe Pro		
50 55 60		

ggc gtc cgg gtc atc cga aac ccc cgc aat ctc ggc ttc acc ggc gcg	240
Gly Val Arg Val Ile Arg Asn Pro Arg Asn Leu Gly Phe Thr Gly Ala	
65 70 75 80	
aac aac gtc ggc atg cgg gcg gcc ctg gcg gag ggc ttc gac cac atc	288
Asn Asn Val Gly Met Arg Ala Ala Leu Ala Glu Gly Phe Asp His Ile	
85 90 95	
ttc ctg gtc aac ccg gac acc tgg aca ccg ccg ggg ctg gtc cgc ggg	336
Phe Leu Val Asn Pro Asp Thr Trp Thr Pro Pro Gly Leu Val Arg Gly	
100 105 110	
ctg gtc gag ttc gcg cag cgg tgg ccg cag tac ggc gtc atc ggc ccg	384
Leu Val Glu Phe Ala Gln Arg Trp Pro Gln Tyr Gly Val Ile Gly Pro	
115 120 125	
ttg cag tac cgc tac gac ccg gcg tcg acc gag ttg acc gac ttc aac	432
Leu Gln Tyr Arg Tyr Asp Pro Ala Ser Thr Glu Leu Thr Asp Phe Asn	
130 135 140	
gac tgg acg cag gtc gcc ctc tac ctg ggc gag cag cac acc ttc gcc	480
Asp Trp Thr Gln Val Ala Leu Tyr Leu Gly Glu Gln His Thr Phe Ala	
145 150 155 160	
ggc gac ctg ctg gat cat ccc tcg cac gtc acc gcg acg gtc cgc gac	528
Gly Asp Leu Leu Asp His Pro Ser His Val Thr Ala Thr Val Arg Asp	
165 170 175	
cgc gcg ccg cgc acc ctg gag cac gcg tac gtg cag ggc tcg gcg ctg	576
Arg Ala Pro Arg Thr Leu Glu His Ala Tyr Val Gln Gly Ser Ala Leu	
180 185 190	
ttc gtc cgg gcc gcc gtg cta cgc gag gtc ggc ctg ctc gac gag gtg	624
Phe Val Arg Ala Ala Val Leu Arg Glu Val Gly Leu Leu Asp Glu Val	
195 200 205	
ttc cac acc tac tac gag gag gtc gac ctg tgc cgg cgg gcc cgg tgg	672
Phe His Thr Tyr Tyr Glu Glu Val Asp Leu Cys Arg Arg Ala Arg Trp	
210 215 220	
gcg ggc tgg cgg gtg gcg ctc cta ctc gac ctc ggc atc cag cac aaa	720
Ala Gly Trp Arg Val Ala Leu Leu Leu Asp Leu Gly Ile Gln His Lys	
225 230 235 240	
ggc ggc ggt ggc acc gcc gcg agc gcg tac agc cgg ata cac atg cgc	768
Gly Gly Gly Gly Thr Ala Ala Ser Ala Tyr Ser Arg Ile His Met Arg	
245 250 255	
cgc aac cgc tac tac tat ctg ctg acc gat gtg gac tgg ccc ccg gcc	816
Arg Asn Arg Tyr Tyr Tyr Leu Leu Thr Asp Val Asp Trp Pro Pro Ala	
260 265 270	
aag gcc gcc cgg ctc gcc gcc cgc tgg ctg ttc tcc gac gtc cgt ggg	864
Lys Ala Ala Arg Leu Ala Ala Arg Trp Leu Phe Ser Asp Val Arg Gly	
275 280 285	
cgg ggc gtg acg ggt cgg acg agc gcg ggc gtc ggg gcg cgg gag acc	912
Arg Gly Val Thr Gly Arg Thr Ser Ala Gly Val Gly Ala Arg Glu Thr	
290 295 300	
ttc gtg gcg ctc ggg tgg ctg gcc cgc cag gcc ccg gtg atc cgg gaa	960
Phe Val Ala Leu Gly Trp Leu Ala Arg Gln Ala Pro Val Ile Arg Glu	
305 310 315 320	

cgt cgt cgg cgg cac cgg ctg ctg cgg gca cga ggg acg ggc gtg gac 1008
 Arg Arg Arg Arg His Arg Leu Leu Arg Ala Arg Gly Thr Gly Val Asp
 325 330 335

cgc gcc cga gag cgg aag gaa acc gtg cgg gga 1041
 Arg Ala Arg Glu Arg Lys Glu Thr Val Arg Gly
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<211> 347

<212> PRT

<213> Micromonospora carbonacea .

<220>

<223> evdF

<400> 13

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Val Gly Thr Asn Glu Ile Arg Trp Leu Asp Arg Ala Leu Gly Ser Leu
 20 25 30

Leu Ala Ser Asp Thr Thr Gly Phe Glu Leu Thr Val Phe Tyr Val Asp
 35 40 45

Asn Ala Ser Ala Asp Gly Ser Val Ala His Val Met Ser Ala Phe Pro
 50 55 60

Gly Val Arg Val Ile Arg Asn Pro Arg Asn Leu Gly Phe Thr Gly Ala
 65 70 75 80

Asn Asn Val Gly Met Arg Ala Ala Leu Ala Glu Gly Phe Asp His Ile
 85 90 95

Phe Leu Val Asn Pro Asp Thr Trp Thr Pro Pro Gly Leu Val Arg Gly
 100 105 110

Leu Val Glu Phe Ala Gln Arg Trp Pro Gln Tyr Gly Val Ile Gly Pro
 115 120 125

Leu Gln Tyr Arg Tyr Asp Pro Ala Ser Thr Glu Leu Thr Asp Phe Asn
 130 135 140

Asp Trp Thr Gln Val Ala Leu Tyr Leu Gly Glu Gln His Thr Phe Ala
 145 150 155 160

Gly Asp Leu Leu Asp His Pro Ser His Val Thr Ala Thr Val Arg Asp
 165 170 175

Arg Ala Pro Arg Thr Leu Glu His Ala Tyr Val Gln Gly Ser Ala Leu
 180 185 190

Phe Val Arg Ala Ala Val Leu Arg Glu Val Gly Leu Leu Asp Glu Val
 195 200 205

Phe His Thr Tyr Tyr Glu Glu Val Asp Leu Cys Arg Arg Ala Arg Trp
 210 215 220

Ala Gly Trp Arg Val Ala Leu Leu Leu Asp Leu Gly Ile Gln His Lys
 225 230 235 240

Gly Gly Gly Gly Thr Ala Ala Ser Ala Tyr Ser Arg Ile His Met Arg
 245 250 255

Arg	Asn	Arg	Tyr 260	Tyr	Tyr	Leu	Leu	Thr 265	Asp	Val	Asp	Trp	Pro 270	Pro	Ala
Lys	Ala	Ala 275	Arg	Leu	Ala	Ala	Arg 280	Trp	Leu	Phe	Ser	Asp 285	Val	Arg	Gly
Arg	Gly 290	Val	Thr	Gly	Arg	Thr 295	Ser	Ala	Gly	Val	Gly 300	Ala	Arg	Glu	Thr
Phe 305	Val	Ala	Leu	Gly	Trp 310	Leu	Ala	Arg	Gln	Ala 315	Pro	Val	Ile	Arg	Glu 320
Arg	Arg	Arg	Arg	His 325	Arg	Leu	Leu	Arg	Ala 330	Arg	Gly	Thr	Gly	Val 335	Asp
Arg	Ala	Arg	Glu 340	Arg	Lys	Glu	Thr 345	Val	Arg	Gly					

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<210> 14
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<212> DNA
<213> Micromonospora carbonacea
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Met	Ser	Arg	Pro	Arg	Ile	Leu	Val	Ala	Gly	Asn	Phe	His	Trp	Gln	Ala	
1				5					10					15		
ggg	ttc	agc	cag	acc	gtc	gcc	gcg	tac	gtg	cgg	gcg	gcc	cgg	gag	gcc	96
Gly	Phe	Ser	Gln	Thr	Val	Ala	Ala	Tyr	Val	Arg	Ala	Ala	Arg	Glu	Ala	
			20					25					30			
gac	tgc	gag	gtg	cgg	ctc	tgc	ggc	ccg	ctg	tcc	cgg	gtc	gac	gcc	gag	144
Asp	Cys	Glu	Val	Arg	Leu	Cys	Gly	Pro	Leu	Ser	Arg	Val	Asp	Ala	Glu	
		35					40					45				
acg	gcc	cgg	cac	ctg	ccg	gtc	gag	ccg	gac	ctc	cgc	tgg	ggc	acc	cac	192
Thr	Ala	Arg	His	Leu	Pro	Val	Glu	Pro	Asp	Leu	Arg	Trp	Gly	Thr	His	
	50					55					60					
ctg	gtg	atc	atg	ttc	gag	gcc	aag	cag	ttc	ctc	acc	gag	gcg	caa	ctg	240
Leu	Val	Ile	Met	Phe	Glu	Ala	Lys	Gln	Phe	Leu	Thr	Glu	Ala	Gln	Leu	
65					70					75					80	
gac	ctc	gtc	gag	gcg	ttc	ccc	cga	cag	cgc	cgg	gcc	atc	gtc	gac	ttc	288
Asp	Leu	Val	Glu	Ala	Phe	Pro	Arg	Gln	Arg	Arg	Ala	Ile	Val	Asp	Phe	
				85					90					95		
gac	ggg	cac	tgg	ggg	gcc	gag	gag	ggc	ggg	gac	ggc	gac	agc	gcg	tcg	336
Asp	Gly	His	Trp	Gly	Ala	Glu	Glu	Gly	Gly	Asp	Gly	Asp	Ser	Ala	Ser	
			100					105					110			
ggc	cgg	tac	tcc	gcg	gag	agt	tgg	cgg	cgg	ttg	tac	tcg	acc	ctg	agc	384
Gly	Arg	Tyr	Ser	Ala	Glu	Ser	Trp	Arg	Arg	Leu	Tyr	Ser	Thr	Leu	Ser	
		115					120					125				

gac	ctg	atc	ctg	caa	ccc	cgg	ctg	ggt	ccg	ctc	ccg	gcc	ggc	gcc	cgg	432
Asp	Leu	Ile	Leu	Gln	Pro	Arg	Leu	Gly	Pro	Leu	Pro	Ala	Gly	Ala	Arg	
	130					135					140					
ttc	ttc	aag	tgc	ttc	ggc	ctg	gca	gcg	ccg	gtg	cgg	cac	ccg	ctg	gaa	480
Phe	Phe	Lys	Cys	Phe	Gly	Leu	Ala	Ala	Pro	Val	Arg	His	Pro	Leu	Glu	
	145				150					155					160	
ctg	ggc	acc	ggc	gcg	cag	tcg	cgc	ccg	tac	gac	ctc	cag	tac	atc	ggc	528
Leu	Gly	Thr	Gly	Ala	Gln	Ser	Arg	Pro	Tyr	Asp	Leu	Gln	Tyr	Ile	Gly	
				165					170					175		
agc	aac	tgg	tgg	cgg	tgg	gag	ccg	atg	acc	gag	atg	gtc	gag	gcc	gcg	576
Ser	Asn	Trp	Trp	Arg	Trp	Glu	Pro	Met	Thr	Glu	Met	Val	Glu	Ala	Ala	
		180						185					190			
gcg	gcg	gcc	cgg	ccg	ccg	ctg	cgc	cgg	ctg	cgg	gtg	tgc	gga	cgc	tgg	624
Ala	Ala	Ala	Arg	Pro	Pro	Leu	Arg	Arg	Leu	Arg	Val	Cys	Gly	Arg	Trp	
		195					200					205				
tgg	gac	ggc	ggc	agt	tgc	gcg	ggc	ttc	gag	gag	gcg	acg	ctc	agc	gag	672
Trp	Asp	Gly	Gly	Ser	Cys	Ala	Gly	Phe	Glu	Glu	Ala	Thr	Leu	Ser	Glu	
	210				215						220					
ccg	ggc	tgg	ctg	cgg	gcg	cgc	ggc	gtc	gag	gtg	cat	ccg	ccc	gtg	ccg	720
Pro	Gly	Trp	Leu	Arg	Ala	Arg	Gly	Val	Glu	Val	His	Pro	Pro	Val	Pro	
	225				230					235					240	
ttc	ggc	cac	gtg	gtc	gag	cag	atg	ggc	cgg	tcg	ctg	atc	tca	ccg	gtc	768
Phe	Gly	His	Val	Val	Glu	Gln	Met	Gly	Arg	Ser	Leu	Ile	Ser	Pro	Val	
				245					250					255		
ctg	gtg	cgg	ccg	ctg	gtc	acc	agc	acc	ggc	ctg	ttg	acc	ccc	cgg	atg	816
Leu	Val	Arg	Pro	Leu	Val	Thr	Ser	Thr	Gly	Leu	Leu	Thr		Arg	Met	
			260					265					270			
ttc	gag	acg	ctg	gcc	tcg	ggc	agc	ctg	ccc	gtg	ctc	ccg	gtc	gcc	gcg	864
Phe	Glu	Thr	Leu	Ala	Ser	Gly	Ser	Leu	Pro	Val	Leu	Pro	Val	Ala	Ala	
		275				280						285				
aag	ttc	ctc	gcg	ccg	gtc	tac	ggc	gac	gag	gcg	gaa	cac	ctg	atg	ctc	912
Lys	Phe	Leu	Ala	Pro	Val	Tyr	Gly	Asp	Glu	Ala	Glu	His	Leu	Met	Leu	
	290					295					300					
ggc	gac	gac	ccg	gcc	gga	acg	ctg	agc	cgg	ctc	tcg	gcc	gag	cac	gaa	960
Gly	Asp	Asp	Pro	Ala	Gly	Thr	Leu	Ser	Arg	Leu	Ser	Ala	Glu	His	Glu	
	305				310					315					320	
cgg	tac	gga	cga	ctg	gtc	ggt	gag	att	cag	gac	cgg	ctc	cgc	gtc	gag	1008
Arg	Tyr	Gly	Arg	Leu	Val	Gly	Glu	Ile	Gln	Asp	Arg	Leu	Arg	Val	Glu	
				325					330					335		
tac	ggc	tac	cct	cgc	gtc	ctg	cgg	gac	ctg	ctc	gat	ctg	ctg	gcc		1053
Tyr	Gly	Tyr	Pro	Arg	Val	Leu	Arg	Asp	Leu	Leu	Asp	Leu	Leu	Ala		
			340					345						350		

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<211> 351

<212> PRT

<213> Micromonospora carbonacea

<220>

<223> evdG

<400> 15

Met	Ser	Arg	Pro	Arg	Ile	Leu	Val	Ala	Gly	Asn	Phe	His	Trp	Gln	Ala	1	5	10	15
Gly	Phe	Ser	Gln	Thr	Val	Ala	Ala	Tyr	Val	Arg	Ala	Ala	Arg	Glu	Ala	20	25	30	
Asp	Cys	Glu	Val	Arg	Leu	Cys	Gly	Pro	Leu	Ser	Arg	Val	Asp	Ala	Glu	35	40	45	
Thr	Ala	Arg	His	Leu	Pro	Val	Glu	Pro	Asp	Leu	Arg	Trp	Gly	Thr	His	50	55	60	
Leu	Val	Ile	Met	Phe	Glu	Ala	Lys	Gln	Phe	Leu	Thr	Glu	Ala	Gln	Leu	65	70	75	80
Asp	Leu	Val	Glu	Ala	Phe	Pro	Arg	Gln	Arg	Arg	Ala	Ile	Val	Asp	Phe	85	90	95	
Asp	Gly	His	Trp	Gly	Ala	Glu	Glu	Gly	Gly	Asp	Gly	Asp	Ser	Ala	Ser	100	105	110	
Gly	Arg	Tyr	Ser	Ala	Glu	Ser	Trp	Arg	Arg	Leu	Tyr	Ser	Thr	Leu	Ser	115	120	125	
Asp	Leu	Ile	Leu	Gln	Pro	Arg	Leu	Gly	Pro	Leu	Pro	Ala	Gly	Ala	Arg	130	135	140	
Phe	Phe	Lys	Cys	Phe	Gly	Leu	Ala	Ala	Pro	Val	Arg	His	Pro	Leu	Glu	145	150	155	160
Leu	Gly	Thr	Gly	Ala	Gln	Ser	Arg	Pro	Tyr	Asp	Leu	Gln	Tyr	Ile	Gly	165	170	175	
Ser	Asn	Trp	Trp	Arg	Trp	Glu	Pro	Met	Thr	Glu	Met	Val	Glu	Ala	Ala	180	185	190	
Ala	Ala	Ala	Arg	Pro	Pro	Leu	Arg	Arg	Leu	Arg	Val	Cys	Gly	Arg	Trp	195	200	205	
Trp	Asp	Gly	Gly	Ser	Cys	Ala	Gly	Phe	Glu	Glu	Ala	Thr	Leu	Ser	Glu	210	215	220	
Pro	Gly	Trp	Leu	Arg	Ala	Arg	Gly	Val	Glu	Val	His	Pro	Pro	Val	Pro	225	230	235	240
Phe	Gly	His	Val	Val	Glu	Gln	Met	Gly	Arg	Ser	Leu	Ile	Ser	Pro	Val	245	250	255	
Leu	Val	Arg	Pro	Leu	Val	Thr	Ser	Thr	Gly	Leu	Leu	Thr	Pro	Arg	Met	260	265	270	
Phe	Glu	Thr	Leu	Ala	Ser	Gly	Ser	Leu	Pro	Val	Leu	Pro	Val	Ala	Ala	275	280	285	
Lys	Phe	Leu	Ala	Pro	Val	Tyr	Gly	Asp	Glu	Ala	Glu	His	Leu	Met	Leu	290	295	300	
Gly	Asp	Asp	Pro	Ala	Gly	Thr	Leu	Ser	Arg	Leu	Ser	Ala	Glu	His	Glu	305	310	315	320
Arg	Tyr	Gly	Arg	Leu	Val	Gly	Glu	Ile	Gln	Asp	Arg	Leu	Arg	Val	Glu	325	330	335	

Tyr Gly Tyr Pro Arg Val Leu Arg Asp Leu Leu Asp Leu Leu Ala
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 <213> Micromonospora carbonacea

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 <222> (1)..(1020)

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 agc gac gag cgg cag tgg atc acg gtc ccg ccg cag ggg tac ggc ggg 96
 Ser Asp Glu Arg Gln Trp Ile Thr Val Pro Pro Gln Gly Tyr Gly Gly
 20 25 30
 atc cag tgg atc gtg gcc aac aag atc aag ggc ctg ctc gaa ctc ggg 144
 Ile Gln Trp Ile Val Ala Asn Lys Ile Lys Gly Leu Leu Glu Leu Gly
 35 40 45
 cac gag gtg ttc ctg ctc ggt gcc ccg ggc agt ccg cgt acg cat cca 192
 His Glu Val Phe Leu Leu Gly Ala Pro Gly Ser Pro Arg Thr His Pro
 50 55 60
 cgc ctg acc gtg gtg ccg gcg ggc gag ccc gag gac atc cgg gca tgg 240
 Arg Leu Thr Val Val Pro Ala Gly Glu Pro Glu Asp Ile Arg Ala Trp
 65 70 75 80
 ttg aag tcc gct ccg gtg gac gtc gtc aac gac tac agc tgc ggc aag 288
 Leu Lys Ser Ala Pro Val Asp Val Val Asn Asp Tyr Ser Cys Gly Lys
 85 90 95
 gtg gat ccg atc gag ctg ccc ccg ggg gtc ggc ctg gtg gcc tcg cac 336
 Val Asp Pro Ile Glu Leu Pro Pro Gly Val Gly Leu Val Ala Ser His
 100 105 110
 cac atg acc acc cgc ccg tcc tat ccg gcc ggc tgc gtg tac gcc tcg 384
 His Met Thr Thr Arg Pro Ser Tyr Pro Ala Gly Cys Val Tyr Ala Ser
 115 120 125
 aag gcg cag cgg gag cag tgc ggc ggc ggc gcg gac gcc ccg gtc atc 432
 Lys Ala Gln Arg Glu Gln Cys Gly Gly Gly Ala Asp Ala Pro Val Ile
 130 135 140
 ccg atc ggg gtg gat ccg tcg ctc tac cgc ccc ggc gac cgc aag gac 480
 Pro Ile Gly Val Asp Pro Ser Leu Tyr Arg Pro Gly Asp Arg Lys Asp
 145 150 155 160
 gac ttc ctg ctc ttc atg ggc cgg atc tcc ccg ttc aag ggc gcg ctg 528
 Asp Phe Leu Leu Phe Met Gly Arg Ile Ser Pro Phe Lys Gly Ala Leu
 165 170 175
 gag gcg gcc gcg ttc gcc cgg gcc gcc ggc cgc cgg cta ctg atg gcc 576
 Glu Ala Ala Ala Phe Ala Arg Ala Ala Gly Arg Arg Leu Leu Met Ala
 180 185 190

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ggc ccg gcc tgg gag ccg gag tac ctc gac cgg atc atg ggc gag tac 624
Gly Pro Ala Trp Glu Pro Glu Tyr Leu Asp Arg Ile Met Gly Glu Tyr
195 200 205

ggc gac cac gtc acc ctc gtc ggc gag gtg ggg ggt cag gaa cgt atg 672
Gly Asp His Val Thr Leu Val Gly Glu Val Gly Gly Gln Glu Arg Met
210 215 220

gac ctg ctc gcc acg gcg gct gcc atc ctg gtg ctc tcc cag ccg gtg 720
Asp Leu Leu Ala Thr Ala Ala Ala Ile Leu Val Leu Ser Gln Pro Val
225 230 235 240

ccc ggc ccg tgg ggc ggc acg tgg tgc gag ccg ggt gcg acc gtg gtg 768
Pro Gly Pro Trp Gly Gly Thr Trp Cys Glu Pro Gly Ala Thr Val Val
245 250 255

tcc gag gcg gcg gcc agc ggc acc ccg gtg gtc ggc acg agc aac ggc 816
Ser Glu Ala Ala Ala Ser Gly Thr Pro Val Val Gly Thr Ser Asn Gly
260 265 270

tgc ctg gcg gag atc gtg ccg gcc gtc ggc gag gtg gtg ggc ttc ggc 864
Cys Leu Ala Glu Ile Val Pro Ala Val Gly Glu Val Val Gly Phe Gly
275 280 285

acc ggc ttc gac gag ccg gag gcc cga gcg gtg ctg tcc cga ctg ccg 912
Thr Gly Phe Asp Glu Arg Glu Ala Arg Ala Val Leu Ser Arg Leu Pro
290 295 300

tcg ccc gcc cag gcg ccg aag gcc gcg atc ccg tgc tgg ggg cac gtg 960
Ser Pro Ala Gln Ala Arg Lys Ala Ala Ile Arg Cys Trp Gly His Val
305 310 315 320

gag atc gcc ccg cgc tac gag gcg gtg tac cgc gac gtg ctg gcc ggc 1008
Glu Ile Ala Arg Arg Tyr Glu Ala Val Tyr Arg Asp Val Leu Ala Gly
325 330 335

gcg cgc tgg tcc
Ala Arg Trp Ser
340

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<210> 17
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<212> PRT
<213> Micromonospora carbonacea

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Ser Asp Glu Arg Gln Trp Ile Thr Val Pro Pro Gln Gly Tyr Gly Gly
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Ile Gln Trp Ile Val Ala Asn Lys Ile Lys Gly Leu Leu Glu Leu Gly
35 40 45

His Glu Val Phe Leu Leu Gly Ala Pro Gly Ser Pro Arg Thr His Pro
50 55 60

Arg Leu Thr Val Val Pro Ala Gly Glu Pro Glu Asp Ile Arg Ala Trp

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65	70					75					80				
Leu	Lys	Ser	Ala	Pro	Val	Asp	Val	Val	Asn	Asp	Tyr	Ser	Cys	Gly	Lys
				85					90					95	
Val	Asp	Pro	Ile	Glu	Leu	Pro	Pro	Gly	Val	Gly	Leu	Val	Ala	Ser	His
			100					105					110		
His	Met	Thr	Thr	Arg	Pro	Ser	Tyr	Pro	Ala	Gly	Cys	Val	Tyr	Ala	Ser
		115					120					125			
Lys	Ala	Gln	Arg	Glu	Gln	Cys	Gly	Gly	Gly	Ala	Asp	Ala	Pro	Val	Ile
	130					135					140				
Pro	Ile	Gly	Val	Asp	Pro	Ser	Leu	Tyr	Arg	Pro	Gly	Asp	Arg	Lys	Asp
145					150					155					160
Asp	Phe	Leu	Leu	Phe	Met	Gly	Arg	Ile	Ser	Pro	Phe	Lys	Gly	Ala	Leu
				165					170					175	
Glu	Ala	Ala	Ala	Phe	Ala	Arg	Ala	Ala	Gly	Arg	Arg	Leu	Leu	Met	Ala
			180					185					190		
Gly	Pro	Ala	Trp	Glu	Pro	Glu	Tyr	Leu	Asp	Arg	Ile	Met	Gly	Glu	Tyr
		195					200					205			
Gly	Asp	His	Val	Thr	Leu	Val	Gly	Glu	Val	Gly	Gly	Gln	Glu	Arg	Met
	210					215					220				
Asp	Leu	Leu	Ala	Thr	Ala	Ala	Ala	Ile	Leu	Val	Leu	Ser	Gln	Pro	Val
225					230					235					240
Pro	Gly	Pro	Trp	Gly	Gly	Thr	Trp	Cys	Glu	Pro	Gly	Ala	Thr	Val	Val
				245					250					255	
Ser	Glu	Ala	Ala	Ala	Ser	Gly	Thr	Pro	Val	Val	Gly	Thr	Ser	Asn	Gly
			260					265					270		
Cys	Leu	Ala	Glu	Ile	Val	Pro	Ala	Val	Gly	Glu	Val	Val	Gly	Phe	Gly
	275						280					285			
Thr	Gly	Phe	Asp	Glu	Arg	Glu	Ala	Arg	Ala	Val	Leu	Ser	Arg	Leu	Pro
	290					295					300				
Ser	Pro	Ala	Gln	Ala	Arg	Lys	Ala	Ala	Ile	Arg	Cys	Trp	Gly	His	Val
305					310					315					320
Glu	Ile	Ala	Arg	Arg	Tyr	Glu	Ala	Val	Tyr	Arg	Asp	Val	Leu	Ala	Gly
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Ala	Arg	Trp	Ser												
			340												

<210> 18
 <211> 759
 <212> DNA
 <213> Micromonospora carbonacea

<220>
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 <222> (1)..(759)

<220>

<223> evdI

<400> 18

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gct tac cgg cgc gat ggc ttc gtg act ctc ccg cag ctc gcc gac gac	96
Ala Tyr Arg Arg Asp Gly Phe Val Thr Leu Pro Gln Leu Ala Asp Asp	
20 25 30	
gcc gag gtc gcc tgg ctc cgg gcc gcc tac gac cgg ctc ttc gcc gat	144
Ala Glu Val Ala Trp Leu Arg Ala Ala Tyr Asp Arg Leu Phe Ala Asp	
35 40 45	
cac gcg tcg ccc gac acc ggc gac tac cgg gac atc gcc ggc cgt ggc	192
His Ala Ser Pro Asp Thr Gly Asp Tyr Arg Asp Ile Ala Gly Arg Gly	
50 55 60	
gac gac gcc gcg cct gcc cgt ctc ccg cag atc gtc cgg ccg gag aaa	240
Asp Asp Ala Ala Pro Ala Arg Leu Pro Gln Ile Val Arg Pro Glu Lys	
65 70 75 80	
tac ctg ccg gag ttg gtg gag acc gcg cac ttc gcg cga tgc cgg gcc	288
Tyr Leu Pro Glu Leu Val Glu Thr Ala His Phe Ala Arg Cys Arg Ala	
85 90 95	
atc gcc tcc gct ttc ctc gac atc ccc gag gac gaa ctc gac ttc tac	336
Ile Ala Ser Ala Phe Leu Asp Ile Pro Glu Asp Glu Leu Asp Phe Tyr	
100 105 110	
ggc cac gcg atc ctc aag ccg ccg cgc tac ggc gca ccc act ccg tgg	384
Gly His Ala Ile Leu Lys Pro Pro Arg Tyr Gly Ala Pro Thr Pro Trp	
115 120 125	
cac cag gac gag gcg tac atg gac ccg cgc tgg tcc cgt cgc ggc ctg	432
His Gln Asp Glu Ala Tyr Met Asp Pro Arg Trp Ser Arg Arg Gly Leu	
130 135 140	
agc atc tgg acc ccg ctc gac gag gcg acg gtg tcc agc ggc tgt ctc	480
Ser Ile Trp Thr Pro Leu Asp Glu Ala Thr Val Ser Ser Gly Cys Leu	
145 150 155 160	
cag tac ctg ccg ggc ctg cac cgg ggc ggg gtg ctc ccg cac cat cac	528
Gln Tyr Leu Pro Gly Leu His Arg Gly Gly Val Leu Pro His His His	
165 170 175	
atc aac cac gac gac gcg atc gaa ggt ctg atg acg gac gag gtc gac	576
Ile Asn His Asp Asp Arg Ile Glu Gly Leu Met Thr Asp Glu Val Asp	
180 185 190	
gac acg gac agc gtc gcc tgc ccg ctg cgg ccg ggc gag gcg gtc atg	624
Asp Thr Asp Ser Val Ala Cys Pro Leu Arg Pro Gly Glu Ala Val Met	
195 200 205	
cac gac ttc cgt gcg ccg cac tac gcc ggc ccg aac gag acg gac cag	672
His Asp Phe Arg Ala Pro His Tyr Ala Gly Pro Asn Glu Thr Asp Gln	
210 215 220	
ccg cgc cgc gcg tac gtc ctg gtg ttc atg agc cag ccg gtc gag gtg	720
Pro Arg Arg Ala Tyr Val Leu Val Phe Met Ser Gln Pro Val Glu Val	
225 230 235 240	
acc gac ccc gag ccg cga ccc tgg ctg cac gac cgg agc	759
Thr Asp Pro Glu Pro Arg Pro Trp Leu His Asp Arg Ser	

245

250

<210> 19
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 <212> PRT
 <213> Micromonospora carbonacea

<220>
 <223> evdI

<400> 19
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 1 5 10 15
 Ala Tyr Arg Arg Asp Gly Phe Val Thr Leu Pro Gln Leu Ala Asp Asp
 20 25 30
 Ala Glu Val Ala Trp Leu Arg Ala Ala Tyr Asp Arg Leu Phe Ala Asp
 35 40 45
 His Ala Ser Pro Asp Thr Gly Asp Tyr Arg Asp Ile Ala Gly Arg Gly
 50 55 60
 Asp Asp Ala Ala Pro Ala Arg Leu Pro Gln Ile Val Arg Pro Glu Lys
 65 70 75 80
 Tyr Leu Pro Glu Leu Val Glu Thr Ala His Phe Ala Arg Cys Arg Ala
 85 90 95
 Ile Ala Ser Ala Phe Leu Asp Ile Pro Glu Asp Glu Leu Asp Phe Tyr
 100 105 110
 Gly His Ala Ile Leu Lys Pro Pro Arg Tyr Gly Ala Pro Thr Pro Trp
 115 120 125
 His Gln Asp Glu Ala Tyr Met Asp Pro Arg Trp Ser Arg Arg Gly Leu
 130 135 140
 Ser Ile Trp Thr Pro Leu Asp Glu Ala Thr Val Ser Ser Gly Cys Leu
 145 150 155 160
 Gln Tyr Leu Pro Gly Leu His Arg Gly Gly Val Leu Pro His His His
 165 170 175
 Ile Asn His Asp Asp Arg Ile Glu Gly Leu Met Thr Asp Glu Val Asp
 180 185 190
 Asp Thr Asp Ser Val Ala Cys Pro Leu Arg Pro Gly Glu Ala Val Met
 195 200 205
 His Asp Phe Arg Ala Pro His Tyr Ala Gly Pro Asn Glu Thr Asp Gln
 210 215 220
 Pro Arg Arg Ala Tyr Val Leu Val Phe Met Ser Gln Pro Val Glu Val
 225 230 235 240
 Thr Asp Pro Glu Pro Arg Pro Trp Leu His Asp Arg Ser
 245 250

<210> 20
 <211> 750
 <212> DNA

<213> Micromonospora carbonacea

<220>

<221> CDS

<222> (1)..(750)

<220>

<223> evdJ

<400> 20

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Met Thr Gly His Ser Ala Val Ala Leu Asp Val Gly Gly Val Val Tyr	
1 5 10 15	
tac gac gag ccg ttc gag ctg gcc tgg ctc cag gac acc ttc gac cgc	96
Tyr Asp Glu Pro Phe Glu Leu Ala Trp Leu Gln Asp Thr Phe Asp Arg	
20 25 30	
ctc cag gcc acc gac ccg acg ctc gac ctg cgt gcg ttt ctg gag cac	144
Leu Gln Ala Thr Asp Pro Thr Leu Asp Leu Arg Ala Phe Leu Glu His	
35 40 45	
gtc gag cgg ttc tac cac tac ggc gag ggc gac cca acc ggc cgg acc	192
Val Glu Arg Phe Tyr His Tyr Gly Glu Gly Asp Pro Thr Gly Arg Thr	
50 55 60	
tgg ctc cac tcg gag gcc gcc gcg ctg agc tgg tcg cgg gtc cgg cag	240
Trp Leu His Ser Glu Ala Ala Ala Leu Ser Trp Ser Arg Val Arg Gln	
65 70 75 80	
tcc tgg ggc gag ctg gcc cag gag att ccc ggt gcc gtt cgc gcg gtc	288
Ser Trp Gly Glu Leu Ala Gln Glu Ile Pro Gly Ala Val Arg Ala Val	
85 90 95	
acc agg ctg gcc agg gaa cta ccc gtc gtg atc gtc gcc aac cag ccc	336
Thr Arg Leu Ala Arg Glu Leu Pro Val Val Ile Val Ala Asn Gln Pro	
100 105 110	
ccc gag tgc gcg gac gta ctg gcc cgg tgg cag gtc agc cag gtc tgc	384
Pro Glu Cys Ala Asp Val Leu Ala Arg Trp Gln Val Ser Gln Val Cys	
115 120 125	
cgg gag gtg ctc ctc gac tcc ctc gtc ggg gtg gcc aag ccc gac ccg	432
Arg Glu Val Leu Leu Asp Ser Leu Val Gly Val Ala Lys Pro Asp Pro	
130 135 140	
gcc ctg ctc ggg ctc gcc ctg cgg cgg ctg gcg atc ccg ccc gcc gag	480
Ala Leu Leu Gly Leu Ala Leu Arg Arg Leu Ala Ile Pro Pro Ala Glu	
145 150 155 160	
ttg ctg gtg gtg ggc aac cgg acg gat cac gac gtc ctg ccc gcg ctc	528
Leu Leu Val Val Gly Asn Arg Thr Asp His Asp Val Leu Pro Ala Leu	
165 170 175	
ggg ctc ggt tgc ccg gtg gcg ttc gtg ctg ccc gat ccg gcg tac cgc	576
Gly Leu Gly Cys Pro Val Ala Phe Val Leu Pro Asp Pro Ala Tyr Arg	
180 185 190	
cgg ccg ccg ggc gtc cat ccg gac ctg gtc cgg gtc tac acg gag ctg	624
Arg Pro Pro Gly Val His Pro Asp Leu Val Arg Val Tyr Thr Glu Leu	
195 200 205	
agg gcg ttc cgc acc ggc tcc ccg ccc gcg gac gcc cgg gtc acc acc	672
Arg Ala Phe Arg Thr Gly Ser Pro Pro Ala Asp Ala Arg Val Thr Thr	
210 215 220	

gtg gcg tcc ctg gcg gcc ctg gcc gac tct ccc ctg acg agt gcc acc 720
 Val Ala Ser Leu Ala Ala Leu Ala Asp Ser Pro Leu Thr Ser Ala Thr
 225 230 235 240

ccg cgt tcg aac gcc ggc acc ggc gga ctt 750
 Pro Arg Ser Asn Ala Gly Thr Gly Gly Leu
 245 250

<210> 21
 <211> 250
 <212> PRT
 <213> Micromonospora carbonacea

<220>
 <223> evdJ

<400> 21
 Met Thr Gly His Ser Ala Val Ala Leu Asp Val Gly Gly Val Val Tyr
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 Tyr Asp Glu Pro Phe Glu Leu Ala Trp Leu Gln Asp Thr Phe Asp Arg
 20 25 30
 Leu Gln Ala Thr Asp Pro Thr Leu Asp Leu Arg Ala Phe Leu Glu His
 35 40 45
 Val Glu Arg Phe Tyr His Tyr Gly Glu Gly Asp Pro Thr Gly Arg Thr
 50 55 60
 Trp Leu His Ser Glu Ala Ala Ala Leu Ser Trp Ser Arg Val Arg Gln
 65 70 75 80
 Ser Trp Gly Glu Leu Ala Gln Glu Ile Pro Gly Ala Val Arg Ala Val
 85 90 95
 Thr Arg Leu Ala Arg Glu Leu Pro Val Val Ile Val Ala Asn Gln Pro
 100 105 110
 Pro Glu Cys Ala Asp Val Leu Ala Arg Trp Gln Val Ser Gln Val Cys
 115 120 125
 Arg Glu Val Leu Leu Asp Ser Leu Val Gly Val Ala Lys Pro Asp Pro
 130 135 140
 Ala Leu Leu Gly Leu Ala Leu Arg Arg Leu Ala Ile Pro Pro Ala Glu
 145 150 155 160
 Leu Leu Val Val Gly Asn Arg Thr Asp His Asp Val Leu Pro Ala Leu
 165 170 175
 Gly Leu Gly Cys Pro Val Ala Phe Val Leu Pro Asp Pro Ala Tyr Arg
 180 185 190
 Arg Pro Pro Gly Val His Pro Asp Leu Val Arg Val Tyr Thr Glu Leu
 195 200 205
 Arg Ala Phe Arg Thr Gly Ser Pro Pro Ala Asp Ala Arg Val Thr Thr
 210 215 220
 Val Ala Ser Leu Ala Ala Leu Ala Asp Ser Pro Leu Thr Ser Ala Thr
 225 230 235 240
 Pro Arg Ser Asn Ala Gly Thr Gly Gly Leu

245

250

<210> 22
 <211> 1245
 <212> DNA
 <213> Micromonospora carbonacea

<220>
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 <222> (1) .. (1245)

<220>
 <223> evdK

<400> 22
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 1 5 10 15

gcc gag gcc ggg cat ccg gtg gcg cgc ttc agc cgt gcc gcc cca ccc 96
 Ala Glu Ala Gly His Pro Val Ala Arg Phe Ser Arg Ala Ala Pro Pro
 20 25 30

gtc gtc gac ggc cgg ccc gcg ccg ggg ctc cgc gag gcg cag gtc gtc 144
 Val Val Asp Gly Arg Pro Ala Pro Gly Leu Arg Glu Ala Gln Val Val
 35 40 45

tac ttc ctc gcc gcc cgg ctg agc ccg gcg ctg gcg gag cag caa ccg 192
 Tyr Phe Leu Ala Ala Arg Leu Ser Pro Ala Leu Ala Glu Gln Gln Pro
 50 55 60

gaa cgg gtc gtc cgg gaa cgc gag ttg ttg ctg gac gtg cta agt gcg 240
 Glu Arg Val Val Arg Glu Arg Glu Leu Leu Leu Asp Val Leu Ser Ala
 65 70 75 80

ctg gcg ggg gtg gac cac cgg ccg gtg ttc gtc ctg gcc agc tcg ggc 288
 Leu Ala Gly Val Asp His Arg Pro Val Phe Val Leu Ala Ser Ser Gly
 85 90 95

ggg gcg gtg tac acg ccg acg gtg tgg ccg ccc tac cac gag cgg tcg 336
 Gly Ala Val Tyr Thr Pro Thr Val Trp Pro Pro Tyr His Glu Arg Ser
 100 105 110

gcc acc ggg ccc gcc tcg gcg tac ggc cgg gcg aag ctg cgg ctg gaa 384
 Ala Thr Gly Pro Ala Ser Ala Tyr Gly Arg Ala Lys Leu Arg Leu Glu
 115 120 125

cag gag ctg ctg cgc cac acc gac cgg gtg cag ccg gtg gtg acc cgg 432
 Gln Glu Leu Leu Arg His Thr Asp Arg Val Gln Pro Val Val Thr Arg
 130 135 140

ctg agc aac gtc tac ggt ccg ggg cag cgg ccg acc ccc ggg tac ggt 480
 Leu Ser Asn Val Tyr Gly Pro Gly Gln Arg Pro Thr Pro Gly Tyr Gly
 145 150 155 160

gtc ctg tca cac tgg ctg gag gcc acc gtg cgc gga gag ccg atc cgg 528
 Val Leu Ser His Trp Leu Glu Ala Thr Val Arg Gly Glu Pro Ile Arg
 165 170 175

ctc ttc ggc gat ccg gcc gtg gtg cgg gac tac gta cac gtc gac gac 576
 Leu Phe Gly Asp Pro Ala Val Val Arg Asp Tyr Val His Val Asp Asp
 180 185 190

gtc acc gcg atc atg gag gtc atc gcg cag cgg gcc ggt gac ggc gac 624

Val	Thr	Ala	Ile	Met	Glu	Val	Ile	Ala	Gln	Arg	Ala	Gly	Asp	Gly	Asp		
		195					200					205					
cgg	gac	cgg	ctg	ccc	acg	gtc	gtg	aac	gtc	ggc	tcg	ggc	ctg	ccc	acc	672	
Arg	Asp	Arg	Leu	Pro	Thr	Val	Val	Asn	Val	Gly	Ser	Gly	Leu	Pro	Thr		
	210					215				220							
tcc	ctc	gcc	gag	ttg	ctc	cag	acg	atg	tcc	acg	gtg	gcc	ggt	cgt	gag	720	
Ser	Leu	Ala	Glu	Leu	Leu	Gln	Thr	Met	Ser	Thr	Val	Ala	Gly	Arg	Glu		
225					230					235					240		
ctg	gag	gtc	atc	cgg	gac	gtc	cgc	cgg	cag	ttc	gac	cat	cgg	ggc	aac	768	
Leu	Glu	Val	Ile	Arg	Asp	Val	Arg	Arg	Gln	Phe	Asp	His	Arg	Gly	Asn		
				245					250					255			
tgg	ctc	gac	acc	acc	ctc	gcc	cgg	gag	acc	ctg	ggc	tgg	cag	gcg	cgg	816	
Trp	Leu	Asp	Thr	Thr	Leu	Ala	Arg	Glu	Thr	Leu	Gly	Trp	Gln	Ala	Arg		
			260					265					270				
atc	agc	ctc	ccc	gac	ggc	gtc	cgc	cag	tgc	tgg	gag	gcc	gtc	ctc	acc	864	
Ile	Ser	Leu	Pro	Asp	Gly	Val	Arg	Gln	Cys	Trp	Glu	Ala	Val	Leu	Thr		
		275					280					285					
cgg	gcg	ggc	ggc	ccg	ggg	ggg	tcc	ccg	gcc	cga	ccg	tca	gcc	cgg	ctc	912	
Arg	Ala	Gly	Gly	Pro	Gly	Gly	Ser	Pro	Ala	Arg	Pro	Ser	Ala	Arg	Leu		
	290					295					300						
ggg	aga	gcg	tct	cgg	ggg	cgg	gaa	ccg	ccg	caa	ccg	cgc	cct	tcg	cag	960	
Gly	Arg	Ala	Ser	Arg	Gly	Arg	Glu	Pro	Pro	Gln	Pro	Arg	Pro	Ser	Gln		
305					310					315					320		
cag	ttc	gtg	gct	caa	ccc	ggc	ggc	ggg	cgc	cgc	ggg	gta	gcc	gag	ggc	1008	
Gln	Phe	Val	Ala	Gln	Pro	Gly	Gly	Gly	Arg	Arg	Gly	Val	Ala	Glu	Gly		
				325					330					335			
cag	tgg	cag	ggc	gag	ccg	gga	ttc	cgg	ggc	cgt	acg	gtg	ccg	gtc	cca	1056	
Gln	Trp	Gln	Gly	Glu	Pro	Gly	Phe	Arg	Gly	Arg	Thr	Val	Pro	Val	Pro		
			340					345					350				
ttc	ctt	gcg	cag	gcc	ggc	ccg	tgc	ctg	gtt	ccg	tcc	ggc	ctc	gca	ccg	1104	
Phe	Leu	Ala	Gln	Ala	Gly	Pro	Cys	Leu	Val	Pro	Ser	Gly	Leu	Ala	Pro		
		355					360					365					
ccc	ctg	cca	gta	cgc	ccg	ccg	cag	cag	gta	ccg	ggg	ggg	cag	ccg	gcc	1152	
Pro	Leu	Pro	Val	Arg	Pro	Pro	Gln	Gln	Val	Pro	Gly	Gly	Gln	Pro	Ala		
	370					375					380						
cgg	gtc	gat	gtc	atg	ggg	gac	cgc	gtg	gtc	cgg	gag	cag	ttg	ctc	gcg	1200	
Arg	Val	Asp	Val	Met	Gly	Asp	Arg	Val	Val	Arg	Glu	Gln	Leu	Leu	Ala		
385					390					395					400		
ggc	gcc	ggc	ggc	ctt	cat	ggc	gct	gat	gaa	gga	ggg	gtc	ctc	ccc		1245	
Gly	Ala	Gly	Gly	Leu	His	Gly	Ala	Asp	Glu	Gly	Gly	Val	Leu	Pro			
				405					410					415			

<210> 23

<211> 415

<212> PRT

<213> Micromonospora carbonacea

<220>

<223> evdK

<400> 23

Val 1	Val	Gly	Ala	Thr 5	Gly	Phe	Ile	Gly	Ser 10	Arg	Leu	Val	Ser	Arg 15	Leu
Ala	Glu	Ala	Gly 20	His	Pro	Val	Ala	Arg 25	Phe	Ser	Arg	Ala	Ala 30	Pro	Pro
Val	Val	Asp 35	Gly	Arg	Pro	Ala	Pro 40	Gly	Leu	Arg	Glu	Ala 45	Gln	Val	Val
Tyr	Phe 50	Leu	Ala	Ala	Arg	Leu 55	Ser	Pro	Ala	Leu	Ala 60	Glu	Gln	Gln	Pro
Glu 65	Arg	Val	Val	Arg	Glu 70	Arg	Glu	Leu	Leu	Leu 75	Asp	Val	Leu	Ser	Ala 80
Leu	Ala	Gly	Val	Asp 85	His	Arg	Pro	Val	Phe 90	Val	Leu	Ala	Ser	Ser 95	Gly
Gly	Ala	Val	Tyr 100	Thr	Pro	Thr	Val	Trp 105	Pro	Pro	Tyr	His	Glu 110	Arg	Ser
Ala	Thr	Gly 115	Pro	Ala	Ser	Ala	Tyr 120	Gly	Arg	Ala	Lys	Leu 125	Arg	Leu	Glu
Gln	Glu 130	Leu	Leu	Arg	His	Thr 135	Asp	Arg	Val	Gln	Pro 140	Val	Val	Thr	Arg
Leu 145	Ser	Asn	Val	Tyr 150	Gly	Pro	Gly	Gln	Arg	Pro 155	Thr	Pro	Gly	Tyr	Gly 160
Val	Leu	Ser	His	Trp 165	Leu	Glu	Ala	Thr	Val 170	Arg	Gly	Glu	Pro	Ile 175	Arg
Leu	Phe	Gly	Asp 180	Pro	Ala	Val	Val	Arg 185	Asp	Tyr	Val	His	Val 190	Asp	Asp
Val	Thr	Ala 195	Ile	Met	Glu	Val	Ile 200	Ala	Gln	Arg	Ala	Gly 205	Asp	Gly	Asp
Arg	Asp 210	Arg	Leu	Pro	Thr	Val 215	Val	Asn	Val	Gly	Ser 220	Gly	Leu	Pro	Thr
Ser 225	Leu	Ala	Glu	Leu 230	Leu	Gln	Thr	Met	Ser	Thr 235	Val	Ala	Gly	Arg	Glu 240
Leu	Glu	Val	Ile	Arg 245	Asp	Val	Arg	Arg	Gln 250	Phe	Asp	His	Arg	Gly 255	Asn
Trp	Leu	Asp	Thr 260	Thr	Leu	Ala	Arg	Glu 265	Thr	Leu	Gly	Trp	Gln 270	Ala	Arg
Ile	Ser	Leu 275	Pro	Asp	Gly	Val	Arg 280	Gln	Cys	Trp	Glu	Ala 285	Val	Leu	Thr
Arg	Ala 290	Gly	Gly	Pro	Gly	Gly 295	Ser	Pro	Ala	Arg	Pro 300	Ser	Ala	Arg	Leu
Gly 305	Arg	Ala	Ser	Arg	Gly 310	Arg	Glu	Pro	Pro	Gln 315	Pro	Arg	Pro	Ser	Gln 320
Gln	Phe	Val	Ala	Gln 325	Pro	Gly	Gly	Gly	Arg 330	Arg	Gly	Val	Ala	Glu 335	Gly
Gln	Trp	Gln 340	Gly	Glu	Pro	Gly	Phe 345	Arg	Gly	Arg	Thr	Val	Pro 350	Val	Pro

Phe Leu Ala Gln Ala Gly Pro Cys Leu Val Pro Ser Gly Leu Ala Pro
 355 360 365

Pro Leu Pro Val Arg Pro Pro Gln Gln Val Pro Gly Gly Gln Pro Ala
 370 375 380

Arg Val Asp Val Met Gly Asp Arg Val Val Arg Glu Gln Leu Leu Ala
 385 390 395 400

Gly Ala Gly Gly Leu His Gly Ala Asp Glu Gly Gly Val Leu Pro
 405 410 415

<210> 24
 <211> 912
 <212> DNA
 <213> Micromonospora carbonacea

<220>
 <221> CDS
 <222> (1)..(912)

<220>
 <223> evdL

<400> 24
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 Met Pro Asn Asn Ala Ser Val Val Ser Arg Asp Pro Ser Asp His Pro
 1 5 10 15

atg gtg gtg gcg atc tgc gcg ttc cgg gtg gag aac gtc agg aaa cac 96
 Met Val Val Ala Ile Cys Ala Phe Arg Val Glu Asn Val Arg Lys His
 20 25 30

ctc gcg cac aac atg gcc cag ctc tcc ggc gac gag tac tac gtc ctg 144
 Leu Ala His Asn Met Ala Gln Leu Ser Gly Asp Glu Tyr Tyr Val Leu
 35 40 45

ctg gac cgg ccc gtc acg gcc gag gcg gag gag gtc gcc gag gag gtc 192
 Leu Asp Arg Pro Val Thr Ala Glu Ala Glu Glu Val Ala Glu Glu Val
 50 55 60

cgg gcc gcc ggc ggc acc atg cgc atc ctc ggt gcc acc aat ggc ctg 240
 Arg Ala Ala Gly Gly Thr Met Arg Ile Leu Gly Ala Thr Asn Gly Leu
 65 70 75 80

tcg gcc tcc cgc aac gcg atg ctc gcc cgc tgg ccg cac cac cat ctg 288
 Ser Ala Ser Arg Asn Ala Met Leu Ala Arg Trp Pro His His His Leu
 85 90 95

atg ttc gtc gac gac gac gtg cgg ctc gac gcc gct gcc gtc gac gcc 336
 Met Phe Val Asp Asp Asp Val Arg Leu Asp Ala Ala Val Asp Ala
 100 105 110

gtc cgc aag agc ctg cgc gac ggc gcg cac gtg gtc ggc acc cgg ctg 384
 Val Arg Lys Ser Leu Arg Asp Gly Ala His Val Val Gly Thr Arg Leu
 115 120 125

gcc cgc ccc gcg ctg cgt ctg ccg tgg tac gtc acc tcc ggc cag ttc 432
 Ala Arg Pro Ala Leu Arg Leu Pro Trp Tyr Val Thr Ser Gly Gln Phe
 130 135 140

cac ctg gtc ggc tgg cac cgt gac cag gga aac atc aag atc tgg ggc 480
 His Leu Val Gly Trp His Arg Asp Gln Gly Asn Ile Lys Ile Trp Gly

145				150					155					160				
gcg	tgc	atg	ggg	gtg	gac	tcc	gcg	ttc	gcg	cac	gcc	cac	ggg	ttg	gat	528		
Ala	Cys	Met	Gly	Val	Asp	Ser	Ala	Phe	Ala	His	Ala	His	Gly	Leu	Asp			
				165					170					175				
ttc	gac	ctg	gcc	ctc	agc	cgt	acc	ggg	ggc	aac	ctc	cag	tca	ggg	gag	576		
Phe	Asp	Leu	Ala	Leu	Ser	Arg	Thr	Gly	Gly	Asn	Leu	Gln	Ser	Gly	Glu			
				180					185					190				
gac	acc	tcc	ttc	atc	agc	gcc	atg	aag	gcc	gcc	ggc	gcc	cgc	gag	caa	624		
Asp	Thr	Ser	Phe	Ile	Ser	Ala	Met	Lys	Ala	Ala	Gly	Ala	Arg	Glu	Gln			
							200						205					
ctg	ctc	ccg	gac	cac	gcg	gtc	acc	cat	gac	atc	gac	ccg	ggc	cgg	ctg	672		
Leu	Leu	Pro	Asp	His	Ala	Val	Thr	His	Asp	Ile	Asp	Pro	Gly	Arg	Leu			
				210					215					220				
acc	ccc	cgg	tac	ctg	ctg	cgg	cgg	gcg	tac	tgg	cag	ggg	cgg	tgc	gag	720		
Thr	Pro	Arg	Tyr	Leu	Leu	Arg	Arg	Ala	Tyr	Trp	Gln	Gly	Arg	Cys	Glu			
					230					235					240			
gcc	gga	cgg	aac	cag	gca	cgg	gcc	ggc	ctg	cgc	aag	gaa	tgg	gac	cgg	768		
Ala	Gly	Arg	Asn	Gln	Ala	Arg	Ala	Gly	Leu	Arg	Lys	Glu	Trp	Asp	Arg			
				245					250					255				
cac	cgt	acg	gcc	ccg	gaa	tcc	cgg	ctc	gcc	ctg	cca	ctg	gcc	ctc	ggc	816		
His	Arg	Thr	Ala	Pro	Glu	Ser	Arg	Leu	Ala	Leu	Pro	Leu	Ala	Leu	Gly			
				260					265					270				
tac	acc	gcg	gcg	acc	gcc	gcc	ggg	ttg	agc	cac	gaa	ctg	ctg	cga	agg	864		
Tyr	Thr	Ala	Ala	Thr	Ala	Ala	Gly	Leu	Ser	His	Glu	Leu	Leu	Arg	Arg			
				275					280					285				
gcg	cgg	ttg	cgg	cgg	ttc	ccg	ccc	ccg	aga	cgc	tct	ccc	gag	ccg	ggc	912		
Ala	Arg	Leu	Arg	Arg	Phe	Pro	Pro	Pro	Arg	Arg	Ser	Pro	Glu	Pro	Gly			
				290					295					300				

<210> 25

<211> 304

<212> PRT

<213> Micromonospora carbonacea

<220>

<223> evdL

<400> 25

Met Pro Asn Asn Ala Ser Val Val Ser Arg Asp Pro Ser Asp His Pro
1 5 10 15

Met Val Val Ala Ile Cys Ala Phe Arg Val Glu Asn Val Arg Lys His
20 25 30

Leu Ala His Asn Met Ala Gln Leu Ser Gly Asp Glu Tyr Tyr Val Leu
35 40 45

Leu Asp Arg Pro Val Thr Ala Glu Ala Glu Glu Val Ala Glu Glu Val
50 55 60

Arg Ala Ala Gly Gly Thr Met Arg Ile Leu Gly Ala Thr Asn Gly Leu
65 70 75 80

Ser Ala Ser Arg Asn Ala Met Leu Ala Arg Trp Pro His His His Leu
85 90 95

Met Phe Val Asp Asp Asp Val Arg Leu Asp Ala Ala Ala Val Asp Ala
100 105 110

Val Arg Lys Ser Leu Arg Asp Gly Ala His Val Val Gly Thr Arg Leu
115 120 125

Ala Arg Pro Ala Leu Arg Leu Pro Trp Tyr Val Thr Ser Gly Gln Phe
130 135 140

His Leu Val Gly Trp His Arg Asp Gln Gly Asn Ile Lys Ile Trp Gly
145 150 155 160

Ala Cys Met Gly Val Asp Ser Ala Phe Ala His Ala His Gly Leu Asp
165 170 175

Phe Asp Leu Ala Leu Ser Arg Thr Gly Gly Asn Leu Gln Ser Gly Glu
180 185 190

Asp Thr Ser Phe Ile Ser Ala Met Lys Ala Ala Gly Ala Arg Glu Gln
195 200 205

Leu Leu Pro Asp His Ala Val Thr His Asp Ile Asp Pro Gly Arg Leu
210 215 220

Thr Pro Arg Tyr Leu Leu Arg Arg Ala Tyr Trp Gln Gly Arg Cys Glu
225 230 235 240

Ala Gly Arg Asn Gln Ala Arg Ala Gly Leu Arg Lys Glu Trp Asp Arg
245 250 255

His Arg Thr Ala Pro Glu Ser Arg Leu Ala Leu Pro Leu Ala Leu Gly
260 265 270

Tyr Thr Ala Ala Thr Ala Ala Gly Leu Ser His Glu Leu Leu Arg Arg
275 280 285

Ala Arg Leu Arg Arg Phe Pro Pro Pro Arg Arg Ser Pro Glu Pro Gly
290 295 300

<210> 26
<211> 951
<212> DNA
<213> Micromonospora carbonacea

<220>
<221> CDS
<222> (1)..(951)

<220>
<223> evrA

<400> 26
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1 5 10 15

cgt cac gtg agc gcc gcg ctt gcc gcc cgg ggc gac gac gtc ctc gtg 96
Arg His Val Ser Ala Ala Leu Ala Ala Arg Gly Asp Asp Val Leu Val
20 25 30

ttg gcc cgc cgc gtc ccg tcg gcg ggg ctg ccg tac cgg gcc cgg gcg 144

Leu	Ala	Arg	Arg	Val	Pro	Ser	Ala	Gly	Leu	Pro	Tyr	Arg	Ala	Arg	Ala	
		35					40					45				
ctg	gac	gtc	gcc	acc	ctg	gag	ccc	gcc	gcg	ctg	gcc	gcc	gtg	ttc	gac	192
Leu	Asp	Val	Ala	Thr	Leu	Glu	Pro	Ala	Ala	Leu	Ala	Ala	Val	Phe	Asp	
	50					55					60					
gcc	gag	cag	ccc	gac	gcg	gtg	gtc	aac	gcc	acc	ggc	ggc	aag	tgg	aac	240
Ala	Glu	Gln	Pro	Asp	Ala	Val	Val	Asn	Ala	Thr	Gly	Gly	Lys	Trp	Asn	
	65				70					75					80	
ctg	acg	gac	gcc	gag	ctg	ccg	tcg	agc	tgc	acg	atc	ccg	acg	tgg	agt	288
Leu	Thr	Asp	Ala	Glu	Leu	Pro	Ser	Ser	Cys	Thr	Ile	Pro	Thr	Trp	Ser	
				85					90					95		
gtc	acc	gcg	gcg	ctg	gag	cgc	acc	cgt	tgc	cgg	ccc	agg	ctg	gtg	cac	336
Val	Thr	Ala	Ala	Leu	Glu	Arg	Thr	Arg	Cys	Arg	Pro	Arg	Leu	Val	His	
			100					105					110			
ctc	ggc	tcg	gtc	ctg	gaa	cgc	gtc	cag	gag	cca	ccc	ggg	gct	ccc	gcc	384
Leu	Gly	Ser	Val	Leu	Glu	Arg	Val	Gln	Glu	Pro	Pro	Gly	Ala	Pro	Ala	
		115					120					125				
ggt	gcc	acg	gtg	ccc	acc	cag	ccg	gag	agc	atg	tac	ggc	agg	gcg	aag	432
Gly	Ala	Thr	Val	Pro	Thr	Gln	Pro	Glu	Ser	Met	Tyr	Gly	Arg	Ala	Lys	
	130					135					140					
ctg	gcc	gcc	acc	cag	gcc	gtg	ctc	gcg	gcg	acg	cgg	gcc	ggc	tcg	gtg	480
Leu	Ala	Ala	Thr	Gln	Ala	Val	Leu	Ala	Ala	Thr	Arg	Ala	Gly	Ser	Val	
	145				150					155					160	
gac	gcg	acg	gtg	ctg	cgg	ctc	gcg	aac	gtg	gtg	ggt	ccg	ggc	gtg	cca	528
Asp	Ala	Thr	Val	Leu	Arg	Leu	Ala	Asn	Val	Val	Gly	Pro	Gly	Val	Pro	
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ccc	gac	agc	ctg	ttg	ggg	cgg	gtc	gtc	gtt	cgc	ctg	gtc	gac	gcg	gcg	576
Pro	Asp	Ser	Leu	Leu	Gly	Arg	Val	Val	Val	Arg	Leu	Val	Asp	Ala	Ala	
			180					185					190			
ggc	cgc	gac	cgg	tcg	gcc	agg	gtg	gag	ttg	tct	ccg	ttg	cgc	gcc	cac	624
Gly	Arg	Asp	Arg	Ser	Ala	Arg	Val	Glu	Leu	Ser	Pro	Leu	Arg	Ala	His	
		195					200					205				
cgg	gac	tac	gtc	gac	gtg	cgg	gac	gtc	gcc	gag	gcg	gtg	gtg	tcg	gcc	672
Arg	Asp	Tyr	Val	Asp	Val	Arg	Asp	Val	Ala	Glu	Ala	Val	Val	Ser	Ala	
	210					215					220					
acg	cgg	gag	tcc	gtc	acc	ggg	cgg	gtg	atc	ggc	gtg	ggg	cgg	ggg	gag	720
Thr	Arg	Glu	Ser	Val	Thr	Gly	Arg	Val	Ile	Gly	Val	Gly	Arg	Gly	Glu	
	225				230					235					240	
gcc	gtt	ccg	gtc	cgc	tcc	ctc	gtg	gag	atg	ttg	atc	gag	gtg	agc	ggg	768
Ala	Val	Pro	Val	Arg	Ser	Leu	Val	Glu	Met	Leu	Ile	Glu	Val	Ser	Gly	
				245					250					255		
gtg	ccg	acc	gag	gtg	gtg	gag	ttg	ccg	gat	cgg	ccc	ggc	tcg	gtg	gag	816
Val	Pro	Thr	Glu	Val	Val	Glu	Leu	Pro	Asp	Arg	Pro	Gly	Ser	Val	Glu	
			260					265					270			
gtc	gtc	gac	tgg	gcc	cgc	gtc	gac	ccg	ggg	ccc	gcg	cgt	gac	ctg	ctc	864
Val	Val	Asp	Trp	Ala	Arg	Val	Asp	Pro	Gly	Pro	Ala	Arg	Asp	Leu	Leu	
		275					280					285				
ggg	tgg	cgg	ccc	cga	cga	tcg	ctg	cgg	gat	gcg	gtg	ggc	ggg	ctc	tgg	912
Gly	Trp	Arg	Pro	Arg	Arg	Ser	Leu	Arg	Asp	Ala	Val	Gly	Gly	Leu	Trp	

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 Asp Glu Ala Ala Ser Arg Leu Pro Asp Arg Ser Arg Arg
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 <213> Micromonospora carbonacea

 <220>
 <223> evrA

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 Arg His Val Ser Ala Ala Leu Ala Ala Arg Gly Asp Asp Val Leu Val
 20 25 30
 Leu Ala Arg Arg Val Pro Ser Ala Gly Leu Pro Tyr Arg Ala Arg Ala
 35 40 45
 Leu Asp Val Ala Thr Leu Glu Pro Ala Ala Leu Ala Ala Val Phe Asp
 50 55 60
 Ala Glu Gln Pro Asp Ala Val Val Asn Ala Thr Gly Gly Lys Trp Asn
 65 70 75 80
 Leu Thr Asp Ala Glu Leu Pro Ser Ser Cys Thr Ile Pro Thr Trp Ser
 85 90 95
 Val Thr Ala Ala Leu Glu Arg Thr Arg Cys Arg Pro Arg Leu Val His
 100 105 110
 Leu Gly Ser Val Leu Glu Arg Val Gln Glu Pro Pro Gly Ala Pro Ala
 115 120 125
 Gly Ala Thr Val Pro Thr Gln Pro Glu Ser Met Tyr Gly Arg Ala Lys
 130 135 140
 Leu Ala Ala Thr Gln Ala Val Leu Ala Ala Thr Arg Ala Gly Ser Val
 145 150 155 160
 Asp Ala Thr Val Leu Arg Leu Ala Asn Val Val Gly Pro Gly Val Pro
 165 170 175
 Pro Asp Ser Leu Leu Gly Arg Val Val Val Arg Leu Val Asp Ala Ala
 180 185 190
 Gly Arg Asp Arg Ser Ala Arg Val Glu Leu Ser Pro Leu Arg Ala His
 195 200 205
 Arg Asp Tyr Val Asp Val Arg Asp Val Ala Glu Ala Val Val Ser Ala
 210 215 220
 Thr Arg Glu Ser Val Thr Gly Arg Val Ile Gly Val Gly Arg Gly Glu
 225 230 235 240
 Ala Val Pro Val Arg Ser Leu Val Glu Met Leu Ile Glu Val Ser Gly
 245 250 255
 Val Pro Thr Glu Val Val Glu Leu Pro Asp Arg Pro Gly Ser Val Glu

260						265						270					
Val	Val	Asp	Trp	Ala	Arg	Val	Asp	Pro	Gly	Pro	Ala	Arg	Asp	Leu	Leu		
		275					280						285				
Gly	Trp	Arg	Pro	Arg	Arg	Ser	Leu	Arg	Asp	Ala	Val	Gly	Gly	Leu	Trp		
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<220>
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1				5				10					15			
gcg	cgc	cgc	cgt	gcc	ctg	ccg	gcg	atc	agg	cgg	gtc	ccg	gag	gcg	gag	96
Ala	Arg	Arg	Arg	Ala	Leu	Pro	Ala	Ile	Arg	Arg	Val	Pro	Glu	Ala	Glu	
			20				25						30			
ctc	gtg	gtg	gtc	gcg	gcg	cgg	gaa	ctg	gcc	aag	gcg	cgc	gcc	ttc	gcc	144
Leu	Val	Val	Val	Ala	Ala	Arg	Glu	Leu	Ala	Lys	Ala	Arg	Ala	Phe	Ala	
		35				40						45				
gcg	gag	ttc	ggg	tgc	gcc	gcc	gcc	gag	ggc	tac	cag	tcc	gtt	ctc	gac	192
Ala	Glu	Phe	Gly	Cys	Ala	Ala	Ala	Glu	Gly	Tyr	Gln	Ser	Val	Leu	Asp	
	50				55					60						
cgc	ccg	gac	atc	gat	gcc	gtc	tac	att	ccg	ctg	ccg	acc	ggg	ctg	cac	240
Arg	Pro	Asp	Ile	Asp	Ala	Val	Tyr	Ile	Pro	Leu	Pro	Thr	Gly	Leu	His	
65				70					75					80		
cac	acc	tgg	atc	gaa	cgc	gcc	ctg	gcc	gcg	ggc	aaa	cac	gtg	ctg	gtg	288
His	Thr	Trp	Ile	Glu	Arg	Ala	Leu	Ala	Ala	Gly	Lys	His	Val	Leu	Val	
			85				90						95			
gag	aag	ccg	ctg	acc	acc	cgg	ctg	gtc	gac	acc	gcg	gcg	gtg	ctg	acc	336
Glu	Lys	Pro	Leu	Thr	Thr	Arg	Leu	Val	Asp	Thr	Ala	Ala	Val	Leu	Thr	
			100				105						110			
cag	gcc	cgg	tcg	cgt	ggg	ctc	gtg	ttg	atg	gac	aac	ctc	acc	ttc	ctc	384
Gln	Ala	Arg	Ser	Arg	Gly	Leu	Val	Leu	Met	Asp	Asn	Leu	Thr	Phe	Leu	
		115				120						125				
cga	cat	ggg	gtg	cac	cac	ttc	gtg	cgc	cgg	atg	gtc	gcg	gcc	ggc	gag	432
Arg	His	Gly	Val	His	His	Phe	Val	Arg	Arg	Met	Val	Ala	Ala	Gly	Glu	
	130					135					140					
atc	ggc	gag	ctg	cgg	atg	gtc	tcc	ggc	gtc	ttc	ggg	ttt	ccg	ccg	ctg	480
Ile	Gly	Glu	Leu	Arg	Met	Val	Ser	Gly	Val	Phe	Gly	Phe	Pro	Pro	Leu	
145					150					155					160	

cct gcg ggc gac atc cgt tac cga ccc gag ctg ggt ggc gga gcg ctg	528
Pro Ala Gly Asp Ile Arg Tyr Arg Pro Glu Leu Gly Gly Gly Ala Leu	
165 170 175	
ctg gat ctg ggc gtc tac ccg ttg ggc gcg gcc cgg ttc ttc ctg ccg	576
Leu Asp Leu Gly Val Tyr Pro Leu Gly Ala Ala Arg Phe Phe Leu Pro	
180 185 190	
gag gag ccg gag gtg gtg gcg gcc acc ctc cgg gag gac ccc gat cgc	624
Glu Glu Pro Glu Val Val Ala Ala Thr Leu Arg Glu Asp Pro Asp Arg	
195 200 205	
ggc gtg gac gtt tcg ggt gcc gcg ctg ttg tgt acg ccg gac ggg cgg	672
Gly Val Asp Val Ser Gly Ala Ala Leu Leu Cys Thr Pro Asp Gly Arg	
210 215 220	
acc gca cag atc gcc ttc ggt ttc gag cac tcc tac cgg tgc gag tac	720
Thr Ala Gln Ile Ala Phe Gly Phe Glu His Ser Tyr Arg Cys Glu Tyr	
225 230 235 240	
cag ctc tgg gga agc gcc ggc cgg atc gtc gtc gac cgg gcg tac acc	768
Gln Leu Trp Gly Ser Ala Gly Arg Ile Val Val Asp Arg Ala Tyr Thr	
245 250 255	
cca ccg ccg gcc tgg cac ccg gtg gtg cgg gtg gag cgg cag gac gag	816
Pro Pro Pro Ala Trp His Pro Val Val Arg Val Glu Arg Gln Asp Glu	
260 265 270	
acg cgg gag ctg acc ttc ccg gcc gag gac cag ttc gtc aac acg atg	864
Thr Arg Glu Leu Thr Phe Pro Ala Glu Asp Gln Phe Val Asn Thr Met	
275 280 285	
cga gag ttc gtc cgc gcc gtc acc gcc ggt cag ccg gcg gag gag gtg	912
Arg Glu Phe Val Arg Ala Val Thr Ala Gly Gln Pro Ala Glu Glu Val	
290 295 300	
acg gcg atc cgc gcc cgg gcc cgg ctg ctg gac gag gtt cgc gac cgg	960
Thr Ala Ile Arg Ala Arg Ala Arg Leu Leu Asp Glu Val Arg Asp Arg	
305 310 315 320	
gcc agg gtg ttg cgc gcc ccc gtg acc tgt cag ggg ccg ggc ggt cgc	1008
Ala Arg Val Leu Arg Ala Pro Val Thr Cys Gln Gly Pro Gly Gly Arg	
325 330 335	
ctg gac gcc gcc ggc gca cga gac	1032
Leu Asp Ala Ala Gly Ala Arg Asp	
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<211> 344

<212> PRT

<213> Micromonospora carbonacea

<220>

<223> evrB

<400> 29

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Ala Arg Arg Arg Ala Leu Pro Ala Ile Arg Arg Val Pro Glu Ala Glu
20 25 30

Leu Val Val Val Ala Ala Arg Glu Leu Ala Lys Ala Arg Ala Phe Ala
 35 40 45
 Ala Glu Phe Gly Cys Ala Ala Ala Glu Gly Tyr Gln Ser Val Leu Asp
 50 55 60
 Arg Pro Asp Ile Asp Ala Val Tyr Ile Pro Leu Pro Thr Gly Leu His
 65 70 75 80
 His Thr Trp Ile Glu Arg Ala Leu Ala Ala Gly Lys His Val Leu Val
 85 90 95
 Glu Lys Pro Leu Thr Thr Arg Leu Val Asp Thr Ala Ala Val Leu Thr
 100 105 110
 Gln Ala Arg Ser Arg Gly Leu Val Leu Met Asp Asn Leu Thr Phe Leu
 115 120 125
 Arg His Gly Val His His Phe Val Arg Arg Met Val Ala Ala Gly Glu
 130 135 140
 Ile Gly Glu Leu Arg Met Val Ser Gly Val Phe Gly Phe Pro Pro Leu
 145 150 155 160
 Pro Ala Gly Asp Ile Arg Tyr Arg Pro Glu Leu Gly Gly Gly Ala Leu
 165 170 175
 Leu Asp Leu Gly Val Tyr Pro Leu Gly Ala Ala Arg Phe Phe Leu Pro
 180 185 190
 Glu Glu Pro Glu Val Val Ala Ala Thr Leu Arg Glu Asp Pro Asp Arg
 195 200 205
 Gly Val Asp Val Ser Gly Ala Ala Leu Leu Cys Thr Pro Asp Gly Arg
 210 215 220
 Thr Ala Gln Ile Ala Phe Gly Phe Glu His Ser Tyr Arg Cys Glu Tyr
 225 230 235 240
 Gln Leu Trp Gly Ser Ala Gly Arg Ile Val Val Asp Arg Ala Tyr Thr
 245 250 255
 Pro Pro Pro Ala Trp His Pro Val Val Arg Val Glu Arg Gln Asp Glu
 260 265 270
 Thr Arg Glu Leu Thr Phe Pro Ala Glu Asp Gln Phe Val Asn Thr Met
 275 280 285
 Arg Glu Phe Val Arg Ala Val Thr Ala Gly Gln Pro Ala Glu Glu Val
 290 295 300
 Thr Ala Ile Arg Ala Arg Ala Arg Leu Leu Asp Glu Val Arg Asp Arg
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 325 330 335
 Leu Asp Ala Ala Gly Ala Arg Asp
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 <212> DNA

<213> Micromonospora carbonacea

<220>

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<222> (1)..(1452)

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<223> evrC

<400> 30

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1				5					10					15		
ctg	acc	cgg	gac	gcg	ggc	ccg	cac	cgg	ccc	ggc	ccg	gtc	gac	ggc	ggc	96
Leu	Thr	Arg	Asp	Ala	Gly	Pro	His	Arg	Pro	Gly	Pro	Val	Asp	Gly	Gly	
			20					25					30			
tcg	tgg	tcg	gcg	ttg	cac	gcc	gag	ggg	gtc	cgg	ccg	gac	ttc	ctc	tcc	144
Ser	Trp	Ser	Ala	Leu	His	Ala	Glu	Gly	Val	Arg	Pro	Asp	Phe	Leu	Ser	
		35				40						45				
tgg	ttc	gcc	gag	cgg	acc	cgg	tcg	acc	tac	tgc	cgg	gtg	gac	cgc	gtg	192
Trp	Phe	Ala	Glu	Arg	Thr	Arg	Ser	Thr	Tyr	Cys	Arg	Val	Asp	Arg	Val	
	50					55					60					
ccg	ctg	gac	cgg	ctg	ccc	ggg	tgg	gcg	ttc	gac	ccg	gtg	acc	ggc	aac	240
Pro	Leu	Asp	Arg	Leu	Pro	Gly	Trp	Ala	Phe	Asp	Pro	Val	Thr	Gly	Asn	
65					70				75						80	
ctc	ggg	cac	gag	agc	ggc	cgg	ttc	ttc	gtg	atc	gag	ggg	ctg	cac	gtc	288
Leu	Gly	His	Glu	Ser	Gly	Arg	Phe	Phe	Val	Ile	Glu	Gly	Leu	His	Val	
				85					90					95		
cag	acc	acc	tac	ggc	gcg	gtg	cgc	gaa	tgg	cac	cag	ccg	atc	atc	aac	336
Gln	Thr	Thr	Tyr	Gly	Ala	Val	Arg	Glu	Trp	His	Gln	Pro	Ile	Ile	Asn	
			100					105					110			
cag	ccg	gag	atc	ggc	atc	ctc	ggc	atg	ctc	gtc	aag	gtc	gtc	gac	ggg	384
Gln	Pro	Glu	Ile	Gly	Ile	Leu	Gly	Met	Leu	Val	Lys	Val	Val	Asp	Gly	
		115					120					125				
aca	ccg	tac	tgc	ctg	ctc	cag	gcc	aag	gtg	gag	ccc	ggc	aac	atc	aac	432
Thr	Pro	Tyr	Cys	Leu	Leu	Gln	Ala	Lys	Val	Glu	Pro	Gly	Asn	Ile	Asn	
	130					135					140					
gtc	atg	cag	ctc	tcg	ccg	acg	gtg	cag	gcc	acc	cgg	agc	aac	tac	acc	480
Val	Met	Gln	Leu	Ser	Pro	Thr	Val	Gln	Ala	Thr	Arg	Ser	Asn	Tyr	Thr	
145					150					155					160	
cgg	gtg	cac	cgt	ggc	ggc	ggc	acg	aag	tac	ctc	gac	tac	ttc	acc	cgc	528
Arg	Val	His	Arg	Gly	Gly	Gly	Thr	Lys	Tyr	Leu	Asp	Tyr	Phe	Thr	Arg	
				165				170						175		
ccg	ggg	gcc	ggt	cgg	gtg	ctg	gtt	gac	gtc	ctg	cag	tcg	gag	cag	ggc	576
Pro	Gly	Ala	Gly	Arg	Val	Leu	Val	Asp	Val	Leu	Gln	Ser	Glu	Gln	Gly	
			180					185					190			
tcc	tgg	ttc	ctg	cgc	aag	cgc	aac	cgg	aac	atg	gtg	gtc	cag	gtc	gac	624
Ser	Trp	Phe	Leu	Arg	Lys	Arg	Asn	Arg	Asn	Met	Val	Val	Gln	Val	Asp	
		195					200					205				
gag	gac	gtg	ccg	gcc	ggc	gac	tac	cac	cgg	tgg	ctc	ccg	ctg	cgc	gaa	672
Glu	Asp	Val	Pro	Ala	Gly	Asp	Tyr	His	Arg	Trp	Leu	Pro	Leu	Arg	Glu	
	210					215					220					

ctg	ctc	gcg	ctg	ctg	cgg	gtg	gac	ggc	ctg	gtc	aac	atg	gac	acg	cgt	720
Leu	Leu	Ala	Leu	Leu	Arg	Val	Asp	Gly	Leu	Val	Asn	Met	Asp	Thr	Arg	
225					230					235					240	
acg	gtg	ctg	tca	tgt	ctg	ccc	tcg	gcc	ttc	tac	gcc	gcg	gcc	cag	gag	768
Thr	Val	Leu	Ser	Cys	Leu	Pro	Ser	Ala	Phe	Tyr	Ala	Ala	Ala	Gln	Glu	
				245					250					255		
acc	gag	gcg	ccg	tcg	tcg	ccg	gcg	gtg	gcg	gcg	atc	gtg	cgc	tcg	gcg	816
Thr	Glu	Ala	Pro	Ser	Ser	Pro	Ala	Val	Ala	Ala	Ile	Val	Arg	Ser	Ala	
			260					265					270			
gcg	ggc	gcc	ccc	ggc	cgc	cac	gac	ctg	gtg	tcg	gtg	ttg	agc	tgg	ttc	864
Ala	Gly	Ala	Pro	Gly	Arg	His	Asp	Leu	Val	Ser	Val	Leu	Ser	Trp	Phe	
		275					280					285				
acc	ggg	gcc	aag	ggc	cgg	cac	gag	atg	acc	gtg	cgg	cgg	gtg	ccg	cta	912
Thr	Gly	Ala	Lys	Gly	Arg	His	Glu	Met	Thr	Val	Arg	Arg	Val	Pro	Leu	
	290					295					300					
cga	ggg	ctg	ccg	gac	tgg	cgg	cac	acc	gcg	gac	ggg	atc	gcg	cgg	gac	960
Arg	Gly	Leu	Pro	Asp	Trp	Arg	His	Thr	Ala	Asp	Gly	Ile	Ala	Arg	Asp	
305					310					315					320	
gac	ggc	cgg	cac	ttc	tcc	gtg	gtc	ggc	gtc	acg	gtg	cgc	atc	gac	aac	1008
Asp	Gly	Arg	His	Phe	Ser	Val	Val	Gly	Val	Thr	Val	Arg	Ile	Asp	Asn	
				325					330					335		
cgc	gag	gtg	acc	ggg	tgg	agt	cag	ccg	ctg	ttg	tat	ccg	cgg	cac	cgg	1056
Arg	Glu	Val	Thr	Gly	Trp	Ser	Gln	Pro	Leu	Leu	Tyr	Pro	Arg	His	Arg	
			340					345					350			
ggc	gtg	gtc	gcc	ttc	ctg	gtc	aag	gaa	atc	gac	gga	gtg	gcg	cac	ctg	1104
Gly	Val	Val	Ala	Phe	Leu	Val	Lys	Glu	Ile	Asp	Gly	Val	Ala	His	Leu	
		355					360					365				
ctg	gtg	cac	gcg	cgc	tac	cag	gcg	ggg	ctg	ctc	gac	gcg	atg	gag	atg	1152
Leu	Val	His	Ala	Arg	Tyr	Gln	Ala	Gly	Leu	Leu	Asp	Ala	Met	Glu	Met	
	370					375					380					
ggc	cca	acg	gtg	cag	tgc	atc	ccg	gac	aac	cag	ccc	ggc	ccc	cga	cca	1200
Gly	Pro	Thr	Val	Gln	Cys	Ile	Pro	Asp	Asn	Gln	Pro	Gly	Pro	Arg	Pro	
385					390					395					400	
ctg	ttc	ctg	gcc	gag	gtg	ctg	gaa	gcc	gcc	ccc	gag	cgt	gtc	ctc	tac	1248
Leu	Phe	Leu	Ala	Glu	Val	Leu	Glu	Ala	Ala	Pro	Glu	Arg	Val	Leu	Tyr	
				405					410					415		
gac	acc	gtg	ctc	acc	gag	gag	ggc	ggg	cga	ttc	tac	cgg	tcg	gag	aac	1296
Asp	Thr	Val	Leu	Thr	Glu	Glu	Gly	Gly	Arg	Phe	Tyr	Arg	Ser	Glu	Asn	
			420					425					430			
cgt	tac	ctc	ctg	gtc	gac	gcc	ggc	gac	gac	ttc	ccg	acc	gag	gtg	ccg	1344
Arg	Tyr	Leu	Leu	Val	Asp	Ala	Gly	Asp	Asp	Phe	Pro	Thr	Glu	Val	Pro	
		435					440					445				
gac	gag	ttc	tgc	tgg	gtg	acg	gtg	cgc	cag	ctg	gag	gcc	ctg	ctc	cgg	1392
Asp	Glu	Phe	Cys	Trp	Val	Thr	Val	Arg	Gln	Leu	Glu	Ala	Leu	Leu	Arg	
	450					455					460					
cac	ggc	tac	tac	ctc	aac	atc	gag	gcc	cgc	agc	ttg	ctg	gcc	tgc	ctg	1440
His	Gly	Tyr	Tyr	Leu	Asn	Ile	Glu	Ala	Arg	Ser	Leu	Leu	Ala	Cys	Leu	
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Arg Ser Leu Trp

1452

<210> 31
<211> 484
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<213> Micromonospora carbonacea

<220>
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Ser Trp Ser Ala Leu His Ala Glu Gly Val Arg Pro Asp Phe Leu Ser
35 40 45
Trp Phe Ala Glu Arg Thr Arg Ser Thr Tyr Cys Arg Val Asp Arg Val
50 55 60
Pro Leu Asp Arg Leu Pro Gly Trp Ala Phe Asp Pro Val Thr Gly Asn
65 70 75 80
Leu Gly His Glu Ser Gly Arg Phe Phe Val Ile Glu Gly Leu His Val
85 90 95
Gln Thr Thr Tyr Gly Ala Val Arg Glu Trp His Gln Pro Ile Ile Asn
100 105 110
Gln Pro Glu Ile Gly Ile Leu Gly Met Leu Val Lys Val Val Asp Gly
115 120 125
Thr Pro Tyr Cys Leu Leu Gln Ala Lys Val Glu Pro Gly Asn Ile Asn
130 135 140
Val Met Gln Leu Ser Pro Thr Val Gln Ala Thr Arg Ser Asn Tyr Thr
145 150 155 160
Arg Val His Arg Gly Gly Gly Thr Lys Tyr Leu Asp Tyr Phe Thr Arg
165 170 175
Pro Gly Ala Gly Arg Val Leu Val Asp Val Leu Gln Ser Glu Gln Gly
180 185 190
Ser Trp Phe Leu Arg Lys Arg Asn Arg Asn Met Val Val Gln Val Asp
195 200 205
Glu Asp Val Pro Ala Gly Asp Tyr His Arg Trp Leu Pro Leu Arg Glu
210 215 220
Leu Leu Ala Leu Leu Arg Val Asp Gly Leu Val Asn Met Asp Thr Arg
225 230 235 240
Thr Val Leu Ser Cys Leu Pro Ser Ala Phe Tyr Ala Ala Ala Gln Glu
245 250 255
Thr Glu Ala Pro Ser Ser Pro Ala Val Ala Ala Ile Val Arg Ser Ala
260 265 270
Ala Gly Ala Pro Gly Arg His Asp Leu Val Ser Val Leu Ser Trp Phe

275					280					285					
Thr	Gly	Ala	Lys	Gly	Arg	His	Glu	Met	Thr	Val	Arg	Arg	Val	Pro	Leu
290						295					300				
Arg	Gly	Leu	Pro	Asp	Trp	Arg	His	Thr	Ala	Asp	Gly	Ile	Ala	Arg	Asp
305					310					315					320
Asp	Gly	Arg	His	Phe	Ser	Val	Val	Gly	Val	Thr	Val	Arg	Ile	Asp	Asn
				325					330					335	
Arg	Glu	Val	Thr	Gly	Trp	Ser	Gln	Pro	Leu	Leu	Tyr	Pro	Arg	His	Arg
			340					345						350	
Gly	Val	Val	Ala	Phe	Leu	Val	Lys	Glu	Ile	Asp	Gly	Val	Ala	His	Leu
		355					360					365			
Leu	Val	His	Ala	Arg	Tyr	Gln	Ala	Gly	Leu	Leu	Asp	Ala	Met	Glu	Met
370						375					380				
Gly	Pro	Thr	Val	Gln	Cys	Ile	Pro	Asp	Asn	Gln	Pro	Gly	Pro	Arg	Pro
385					390					395					400
Leu	Phe	Leu	Ala	Glu	Val	Leu	Glu	Ala	Ala	Pro	Glu	Arg	Val	Leu	Tyr
				405					410					415	
Asp	Thr	Val	Leu	Thr	Glu	Glu	Gly	Gly	Arg	Phe	Tyr	Arg	Ser	Glu	Asn
			420					425					430		
Arg	Tyr	Leu	Leu	Val	Asp	Ala	Gly	Asp	Asp	Phe	Pro	Thr	Glu	Val	Pro
		435					440					445			
Asp	Glu	Phe	Cys	Trp	Val	Thr	Val	Arg	Gln	Leu	Glu	Ala	Leu	Leu	Arg
	450					455					460				
His	Gly	Tyr	Tyr	Leu	Asn	Ile	Glu	Ala	Arg	Ser	Leu	Leu	Ala	Cys	Leu
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Arg Ser Leu Trp															

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1				5					10				15			
gga	att	acc	ggc	cag	gac	ggc	acg	tat	ctc	gcg	gag	cac	ctg	ctt	cag	96
Gly	Ile	Thr	Gly	Gln	Asp	Gly	Thr	Tyr	Leu	Ala	Glu	His	Leu	Leu	Gln	
			20					25				30				
tcc	gga	tac	gag	gta	ttt	gga	ttg	gtg	cgc	ggg	cag	acc	gcg	ccc	tcg	144

Ser	Gly	Tyr	Glu	Val	Phe	Gly	Leu	Val	Arg	Gly	Gln	Thr	Ala	Pro	Ser	
		35					40					45				
gtc	cgc	agc	ctt	cgg	caa	cct	gat	cca	gcg	gtc	aag	ctg	atc	agc	ggc	192
Val	Arg	Ser	Leu	Arg	Gln	Pro	Asp	Pro	Ala	Val	Lys	Leu	Ile	Ser	Gly	
	50					55					60					
gac	ctt	ctg	gat	cag	acg	agc	ctg	gtg	gcg	gcg	atc	gaa	cgc	gcg	gcg	240
Asp	Leu	Leu	Asp	Gln	Thr	Ser	Leu	Val	Ala	Ala	Ile	Glu	Arg	Ala	Ala	
	65				70					75					80	
ccg	gac	gag	gtc	tac	aac	ctc	ggc	gcg	ctg	tcg	tac	gtg	ccg	gtg	tcg	288
Pro	Asp	Glu	Val	Tyr	Asn	Leu	Gly	Ala	Leu	Ser	Tyr	Val	Pro	Val	Ser	
				85					90					95		
tgg	cgg	cag	tcc	acc	acg	acg	gcg	gag	gtc	acc	ggc	atg	ggg	gtg	ctc	336
Trp	Arg	Gln	Ser	Thr	Thr	Thr	Ala	Glu	Val	Thr	Gly	Met	Gly	Val	Leu	
			100					105					110			
cgc	atg	ctc	gaa	gcc	ttg	cgg	atc	gtg	ggg	ggc	ctg	tcg	gat	tcc	cgc	384
Arg	Met	Leu	Glu	Ala	Leu	Arg	Ile	Val	Gly	Gly	Leu	Ser	Asp	Ser	Arg	
		115					120					125				
agt	ccc	gca	gcc	ggg	cag	ccg	cgc	ttt	tat	cag	gcg	tct	tcg	tcg	gag	432
Ser	Pro	Ala	Ala	Gly	Gln	Pro	Arg	Phe	Tyr	Gln	Ala	Ser	Ser	Ser	Glu	
	130					135					140					
atg	ttc	ggc	aag	gtg	cgg	gag	ccc	gtc	cag	aat	gag	ctg	acc	ccg	ttc	480
Met	Phe	Gly	Lys	Val		Glu	Pro	Val	Gln	Asn	Glu	Leu	Thr	Pro	Phe	
	145				150					155					160	
cat	ccg	cgt	agc	ccg	tac	ggc	gcg	gcc	aag	gcg	ttc	ggg	cat	tac	atg	528
His	Pro	Arg	Ser	Pro	Tyr	Gly	Ala	Ala	Lys	Ala	Phe	Gly	His	Tyr	Met	
				165					170					175		
gtg	cag	aac	tac	cgt	gag	tcg	tac	ggc	atg	tat	gcc	gtc	tcc	ggc	att	576
Val	Gln	Asn	Tyr	Arg	Glu	Ser	Tyr	Gly	Met	Tyr	Ala	Val	Ser	Gly	Ile	
			180					185					190			
ctg	ttc	aac	cac	gaa	tca	ccg	gtg	cgt	ggg	ccc	gag	ttc	gtc	acc	cgc	624
Leu	Phe	Asn	His	Glu	Ser	Pro	Val	Arg	Gly	Pro	Glu	Phe	Val	Thr	Arg	
		195					200					205				
aag	gtg	tcg	ctg	ggc	gtg	gcg	gcg	gtg	aag	ctg	ggc	att	cgc	agc	tcg	672
Lys	Val	Ser	Leu	Gly	Val	Ala	Ala	Val	Lys	Leu	Gly	Ile	Arg	Ser	Ser	
	210					215					220					
ctt	cgc	ctg	ggc	aac	ctc	tcg	gcc	gag	cgg	gac	tgg	ggc	ttc	gcg	ggc	720
Leu	Arg	Leu	Gly	Asn	Leu	Ser	Ala	Glu	Arg	Asp	Trp	Gly	Phe	Ala	Gly	
	225				230					235					240	
gac	tac	gtg	cgg	ggc	atg	gtc	ctg	atg	ctg	gcc	cag	gac	gag	ccg	gag	768
Asp	Tyr	Val	Arg	Gly	Met	Val	Leu	Met	Leu	Ala	Gln	Asp	Glu	Pro	Glu	
				245					250					255		
gac	tac	gtc	ctc	ggc	acg	ggg	gtc	acg	cac	agc	gtc	cgc	gag	ctg	gtc	816
Asp	Tyr	Val	Leu	Gly	Thr	Gly	Val	Thr	His	Ser	Val	Arg	Glu	Leu	Val	
			260					265					270			
gag	gcg	gcc	ttc	gcc	cac	gtg	ggc	ctc	aac	tgg	cgg	gac	cac	gtg	gtg	864
Glu	Ala	Ala	Phe	Ala	His	Val	Gly	Leu	Asn	Trp	Arg	Asp	His	Val	Val	
		275					280					285				
gtg	gac	gag	tcg	ctc	atc	cgg	ccc	gcc	gag	gtc	gag	ctg	ctc	tgc	gcg	912
Val	Asp	Glu	Ser	Leu	Ile	Arg	Pro	Ala	Glu	Val	Glu	Leu	Leu	Cys	Ala	

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gat ccg acg aag gcc cgc cag cgg ctc ggc tgg aaa ccc tcc gtc tcc			960
Asp Pro Thr Lys Ala Arg Gln Arg Leu Gly Trp Lys Pro Ser Val Ser			
305	310	315	320
ttc gag gag atg gtc gcc atg atg gtc gac agc gat ctg cgc ctg ttg			1008
Phe Glu Glu Met Val Ala Met Met Val Asp Ser Asp Leu Arg Leu Leu			
	325	330	335
gcg gac acg gac ggg tct tcc cac gcc ttt tcc gcc gaa ctg gcc gag			1056
Ala Asp Thr Asp Gly Ser Ser His Ala Phe Ser Ala Glu Leu Ala Glu			
	340	345	350
ctg tgg			1062
Leu Trp			
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Gly Ile Thr Gly Gln Asp Gly Thr Tyr Leu Ala Glu His Leu Leu Gln			
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Ser Gly Tyr Glu Val Phe Gly Leu Val Arg Gly Gln Thr Ala Pro Ser			
	35	40	45
Val Arg Ser Leu Arg Gln Pro Asp Pro Ala Val Lys Leu Ile Ser Gly			
	50	55	60
Asp Leu Leu Asp Gln Thr Ser Leu Val Ala Ala Ile Glu Arg Ala Ala			
	65	70	75
Pro Asp Glu Val Tyr Asn Leu Gly Ala Leu Ser Tyr Val Pro Val Ser			
	85	90	95
Trp Arg Gln Ser Thr Thr Thr Ala Glu Val Thr Gly Met Gly Val Leu			
	100	105	110
Arg Met Leu Glu Ala Leu Arg Ile Val Gly Gly Leu Ser Asp Ser Arg			
	115	120	125
Ser Pro Ala Ala Gly Gln Pro Arg Phe Tyr Gln Ala Ser Ser Ser Glu			
	130	135	140
Met Phe Gly Lys Val Arg Glu Pro Val Gln Asn Glu Leu Thr Pro Phe			
	145	150	155
His Pro Arg Ser Pro Tyr Gly Ala Ala Lys Ala Phe Gly His Tyr Met			
	165	170	175
Val Gln Asn Tyr Arg Glu Ser Tyr Gly Met Tyr Ala Val Ser Gly Ile			
	180	185	190
Leu Phe Asn His Glu Ser Pro Val Arg Gly Pro Glu Phe Val Thr Arg			
	195	200	205

Lys Val Ser Leu Gly Val Ala Ala Val Lys Leu Gly Ile Arg Ser Ser
 210 215 220
 Leu Arg Leu Gly Asn Leu Ser Ala Glu Arg Asp Trp Gly Phe Ala Gly
 225 230 235 240
 Asp Tyr Val Arg Gly Met Val Leu Met Leu Ala Gln Asp Glu Pro Glu
 245 250 255
 Asp Tyr Val Leu Gly Thr Gly Val Thr His Ser Val Arg Glu Leu Val
 260 265 270
 Glu Ala Ala Phe Ala His Val Gly Leu Asn Trp Arg Asp His Val Val
 275 280 285
 Val Asp Glu Ser Leu Ile Arg Pro Ala Glu Val Glu Leu Leu Cys Ala
 290 295 300
 Asp Pro Thr Lys Ala Arg Gln Arg Leu Gly Trp Lys Pro Ser Val Ser
 305 310 315 320
 Phe Glu Glu Met Val Ala Met Met Val Asp Ser Asp Leu Arg Leu Leu
 325 330 335
 Ala Asp Thr Asp Gly Ser Ser His Ala Phe Ser Ala Glu Leu Ala Glu
 340 345 350
 Leu Trp

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 gac aac acc atc atc ggc acc gca ctg ccc acc gtg gtc ggc gag ttg 96
 Asp Asn Thr Ile Ile Gly Thr Ala Leu Pro Thr Val Val Gly Glu Leu
 20 25 30
 ggc ggc ctc agc acg ctc tcc tgg gtg atc acc tcg tac acg ctg gcc 144
 Gly Gly Leu Ser Thr Leu Ser Trp Val Ile Thr Ser Tyr Thr Leu Ala
 35 40 45
 acg gcc gcc tcc acg ccg gtc tgg ggc aag ctc gcc gac atg tac ggc 192
 Thr Ala Ala Ser Thr Pro Val Trp Gly Lys Leu Ala Asp Met Tyr Gly
 50 55 60
 ggc aag gtg gtc ttc gtg gcc acg ctg gtc gtg ttc ctg gcc ggg tcg 240
 Gly Lys Val Val Phe Val Ala Thr Leu Val Val Phe Leu Ala Gly Ser
 65 70 75 80

ctg	ctg	tcc	ggc	atg	gcg	cag	agc	atc	acc	cag	ctg	acc	gtc	ttc	cgg	288
Leu	Leu	Ser	Gly	Met	Ala	Gln	Ser	Ile	Thr	Gln	Leu	Thr	Val	Phe	Arg	
				85					90					95		
gcc	gtg	cac	ggg	ctc	ggc	gcg	ggc	ggc	ctg	atg	gtc	tgc	gcg	ttc	gcc	336
Ala	Val	His	Gly	Leu	Gly	Ala	Gly	Gly	Leu	Met	Val	Cys	Ala	Phe	Ala	
			100					105					110			
atc	atg	gtg	gag	gtt	ctc	gcc	ggc	cct	gac	ctg	ccc	aag	tac	cag	ggc	384
Ile	Met	Val	Glu	Val	Leu	Ala	Gly	Pro	Asp	Leu	Pro	Lys	Tyr	Gln	Gly	
		115					120					125				
atc	atg	tgc	gcg	acc	atg	ggc	ctg	acc	atg	gtg	gcg	ggc	ccg	ctc	gtc	432
Ile	Met	Ser	Ala	Thr	Met	Gly	Leu	Thr	Met	Val	Ala	Gly	Pro	Leu	Val	
	130					135					140					
ggc	ggc	ctg	atc	acc	gat	gag	ctc	ggc	tgg	cgc	tgg	tgc	ttc	tac	atc	480
Gly	Gly	Leu	Ile	Thr	Asp	Glu	Leu	Gly	Trp	Arg	Trp	Cys	Phe	Tyr	Ile	
145					150					155					160	
aac	ctg	ccg	atc	ggg	gcg	gtc	gcg	ctg	ctc	atc	gtg	gtg	ctg	atg	atg	528
Asn	Leu	Pro	Ile	Gly	Ala	Val	Ala	Leu	Leu	Ile	Val	Val	Leu	Met	Met	
				165					170					175		
cac	ctg	ccg	cgc	cga	cac	acc	aag	gcc	cgg	atc	gat	tac	gcg	ggc	gct	576
His	Leu	Pro	Arg	Arg	His	Thr	Lys	Ala	Arg	Ile	Asp	Tyr	Ala	Gly	Ala	
			180					185					190			
gcc	ctg	ctc	acc	gtg	gtc	agt	tgc	tgc	gtc	gtg	ctg	gtg	acc	acc	tgg	624
Ala	Leu	Leu	Thr	Val	Val	Ser	Ser	Cys	Val	Val	Leu	Val	Thr	Thr	Trp	
		195					200					205				
ggc	ggc	atc	acc	tac	ccc	tgg	gcg	tct	ccg	atg	atc	ctg	ggg	ctg	gtc	672
Gly	Gly	Ile	Thr	Tyr	Pro	Trp	Ala	Ser	Pro	Met	Ile	Leu	Gly	Leu	Val	
210						215					220					
gcg	ctc	ggg	gtg	ctg	acc	tgc	gcg	ctc	ttc	gtg	gtg	gtc	gag	cga	cgg	720
Ala	Leu	Gly	Val	Leu	Thr	Cys	Ala	Leu	Phe	Val	Val	Val	Glu	Arg	Arg	
225					230					235					240	
gtg	gcc	gag	ccg	ttg	gtg	ccc	ctg	gcc	atg	ttc	cgc	agc	ctg	aac	ttc	768
Val	Ala	Glu	Pro	Leu	Val	Pro	Leu	Ala	Met	Phe	Arg	Ser	Leu	Asn	Phe	
				245					250					255		
acc	ctg	agc	acc	ctc	atc	gcc	ttc	ctg	gtc	ggc	ttc	gcc	ctc	atc	gcg	816
Thr	Leu	Ser	Thr	Leu	Ile	Ala	Phe	Leu	Val	Gly	Phe	Ala	Leu	Ile	Ala	
			260					265					270			
ggg	ctg	acc	ttc	ctg	gcc	ctg	ttc	cag	cag	gcg	gtg	cag	ggc	gcc	tcc	864
Gly	Leu	Thr	Phe	Leu	Ala	Leu	Phe	Gln	Gln	Ala	Val	Gln	Gly	Ala	Ser	
		275					280					285				
gcg	tcc	gac	tcc	ggc	ctg	ttg	ctg	ctg	ccc	ctg	ctg	ctg	tcc	atg	gcg	912
Ala	Ser	Asp	Ser	Gly	Leu	Leu	Leu	Leu	Pro	Leu	Leu	Leu	Ser	Met	Ala	
	290					295					300					
gcg	gtc	aac	gtg	gtc	ggg	ggc	cgc	ctg	atg	agc	ggc	ggg	cgt	tcc	tac	960
Ala	Val	Asn	Val	Val	Gly	Gly	Arg	Leu	Met	Ser	Gly	Gly	Arg	Ser	Tyr	
305					310					315					320	
cgg	ctg	ctg	atg	ctc	gcc	ggc	gcg	gcg	ctg	atg	acc	ctg	agc	ctg	ctg	1008
Arg	Leu	Leu	Met	Leu	Ala	Gly	Ala	Ala	Leu	Met	Thr	Leu	Ser	Leu	Leu	
				325					330					335		

ctc ttc gcc ctg atg gac gtg ggc acc agc cgg acg gtc acc gcg atc 1056
 Leu Phe Ala Leu Met Asp Val Gly Thr Ser Arg Thr Val Thr Ala Ile
 340 345 350

ccc atg gtc ggc ttc ggc gca ggg ctg ggg ctg ctc atg cag acc agc 1104
 Pro Met Val Gly Phe Gly Ala Gly Leu Gly Leu Leu Met Gln Thr Ser
 355 360 365

ctg atg gtg gcg ctg agc agc gtg gag atg agg aac ctc ggg gtg gcc 1152
 Leu Met Val Ala Leu Ser Ser Val Glu Met Arg Asn Leu Gly Val Ala
 370 375 380

gcc tcc acg tcc acg ctc ttc cgc acc atc ggt ggg gcg gtg ggg gcg 1200
 Ala Ser Thr Ser Thr Leu Phe Arg Thr Ile Gly Gly Ala Val Gly Ala
 385 390 395 400

tcg gcg acg gtc tcg ctg ttc tcc gtg cgg gtg cag tcg gcg ctg gcc 1248
 Ser Ala Thr Val Ser Leu Phe Ser Val Arg Val Gln Ser Ala Leu Ala
 405 410 415

gat cgg ggg gtc gcc gac gtg gct gac ctc ctc ggc cac tcc gcg cgg 1296
 Asp Arg Gly Val Ala Asp Val Ala Asp Leu Leu Gly His Ser Ala Arg
 420 425 430

ctg gac gcc gcc ggg ctg gcc caa ctc ccc cgg gcc gtc cgt gtc cac 1344
 Leu Asp Ala Ala Gly Leu Ala Gln Leu Pro Arg Ala Val Arg Val His
 435 440 445

ttc atg cac gcg gtg gcc tcc ggc acc cgg tgg gcc ttc ctg atg acc 1392
 Phe Met His Ala Val Ala Ser Gly Thr Arg Trp Ala Phe Leu Met Thr
 450 455 460

gtg ctg gcg ggg ctg atc tgc gtc gcg gcg gcg tgg ttc ctg cgc cgg 1440
 Val Leu Ala Gly Leu Ile Cys Val Ala Ala Ala Trp Phe Leu Arg Arg
 465 470 475 480

gtc acc ccg ttg acg tcg gca ccg gtg gca ccc gaa ccg gcg cgc gac 1488
 Val Thr Pro Leu Thr Ser Ala Pro Val Ala Pro Glu Pro Ala Arg Asp
 485 490 495

gtc gcc gcg ccc gcc gcc agc agc ggg cgc gcg ccg aac tac 1530
 Val Ala Ala Pro Ala Ala Ser Ser Gly Arg Ala Pro Asn Tyr
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<223> evrE

<400> 35

Met Val Ala Leu Val Ala Val Met Ile Pro Met Val Leu Ala Thr Leu
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Asp Asn Thr Ile Ile Gly Thr Ala Leu Pro Thr Val Val Gly Glu Leu
 20 25 30

Gly Gly Leu Ser Thr Leu Ser Trp Val Ile Thr Ser Tyr Thr Leu Ala
 35 40 45

Thr Ala Ala Ser Thr Pro Val Trp Gly Lys Leu Ala Asp Met Tyr Gly
 50 55 60

Gly	Lys	Val	Val	Phe	Val	Ala	Thr	Leu	Val	Val	Phe	Leu	Ala	Gly	Ser	65	70	75	80
Leu	Leu	Ser	Gly	Met	Ala	Gln	Ser	Ile	Thr	Gln	Leu	Thr	Val	Phe	Arg	85	90	95	
Ala	Val	His	Gly	Leu	Gly	Ala	Gly	Gly	Leu	Met	Val	Cys	Ala	Phe	Ala	100	105	110	
Ile	Met	Val	Glu	Val	Leu	Ala	Gly	Pro	Asp	Leu	Pro	Lys	Tyr	Gln	Gly	115	120	125	
Ile	Met	Ser	Ala	Thr	Met	Gly	Leu	Thr	Met	Val	Ala	Gly	Pro	Leu	Val	130	135	140	
Gly	Gly	Leu	Ile	Thr	Asp	Glu	Leu	Gly	Trp	Arg	Trp	Cys	Phe	Tyr	Ile	145	150	155	160
Asn	Leu	Pro	Ile	Gly	Ala	Val	Ala	Leu	Leu	Ile	Val	Val	Leu	Met	Met	165	170	175	
His	Leu	Pro	Arg	Arg	His	Thr	Lys	Ala	Arg	Ile	Asp	Tyr	Ala	Gly	Ala	180	185	190	
Ala	Leu	Leu	Thr	Val	Val	Ser	Ser	Cys	Val	Val	Leu	Val	Thr	Thr	Trp	195	200	205	
Gly	Gly	Ile	Thr	Tyr	Pro	Trp	Ala	Ser	Pro	Met	Ile	Leu	Gly	Leu	Val	210	215	220	
Ala	Leu	Gly	Val	Leu	Thr	Cys	Ala	Leu	Phe	Val	Val	Val	Glu	Arg	Arg	225	230	235	240
Val	Ala	Glu	Pro	Leu	Val	Pro	Leu	Ala	Met	Phe	Arg	Ser	Leu	Asn	Phe	245	250	255	
Thr	Leu	Ser	Thr	Leu	Ile	Ala	Phe	Leu	Val	Gly	Phe	Ala	Leu	Ile	Ala	260	265	270	
Gly	Leu	Thr	Phe	Leu	Ala	Leu	Phe	Gln	Gln	Ala	Val	Gln	Gly	Ala	Ser	275	280	285	
Ala	Ser	Asp	Ser	Gly	Leu	Leu	Leu	Leu	Pro	Leu	Leu	Leu	Ser	Met	Ala	290	295	300	
Ala	Val	Asn	Val	Val	Gly	Gly	Arg	Leu	Met	Ser	Gly	Gly	Arg	Ser	Tyr	305	310	315	320
Arg	Leu	Leu	Met	Leu	Ala	Gly	Ala	Ala	Leu	Met	Thr	Leu	Ser	Leu	Leu	325	330	335	
Leu	Phe	Ala	Leu	Met	Asp	Val	Gly	Thr	Ser	Arg	Thr	Val	Thr	Ala	Ile	340	345	350	
Pro	Met	Val	Gly	Phe	Gly	Ala	Gly	Leu	Gly	Leu	Leu	Met	Gln	Thr	Ser	355	360	365	
Leu	Met	Val	Ala	Leu	Ser	Ser	Val	Glu	Met	Arg	Asn	Leu	Gly	Val	Ala	370	375	380	
Ala	Ser	Thr	Ser	Thr	Leu	Phe	Arg	Thr	Ile	Gly	Gly	Ala	Val	Gly	Ala	385	390	395	400
Ser	Ala	Thr	Val	Ser	Leu	Phe	Ser	Val	Arg	Val	Gln	Ser	Ala	Leu	Ala				

405					410					415					
Asp	Arg	Gly	Val	Ala	Asp	Val	Ala	Asp	Leu	Leu	Gly	His	Ser	Ala	Arg
			420					425					430		
Leu	Asp	Ala	Ala	Gly	Leu	Ala	Gln	Leu	Pro	Arg	Ala	Val	Arg	Val	His
		435					440					445			
Phe	Met	His	Ala	Val	Ala	Ser	Gly	Thr	Arg	Trp	Ala	Phe	Leu	Met	Thr
	450					455					460				
Val	Leu	Ala	Gly	Leu	Ile	Cys	Val	Ala	Ala	Ala	Trp	Phe	Leu	Arg	Arg
465					470					475					480
Val	Thr	Pro	Leu	Thr	Ser	Ala	Pro	Val	Ala	Pro	Glu	Pro	Ala	Arg	Asp
				485					490					495	
Val	Ala	Ala	Pro	Ala	Ala	Ser	Ser	Gly	Arg	Ala	Pro	Asn	Tyr		
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Met	Ser	Ser	Lys	Ile	Leu	Val	Ile	Gly	Gly	Gly	Pro	Ala	Gly	Ser	Thr	
1				5				10						15		
gcc	gcc	gcg	ctg	ctc	gcc	cga	tcg	ggg	ctg	tcg	gtg	acg	ctc	ctg	gaa	96
Ala	Ala	Ala	Leu	Leu	Ala	Arg	Ser	Gly	Leu	Ser	Val	Thr	Leu	Leu	Glu	
			20					25					30			
aag	gag	acg	ttc	ccg	cga	tac	cac	atc	ggc	gag	tcg	atc	gcg	tcc	tcg	144
Lys	Glu	Thr	Phe	Pro	Arg	Tyr	His	Ile	Gly	Glu	Ser	Ile	Ala	Ser	Ser	
		35				40						45				
tgc	cgc	acc	atc	gtc	gat	ttc	gtg	ggc	gct	ctc	gac	gag	gtc	gac	tcg	192
Cys	Arg	Thr	Ile	Val	Asp	Phe	Val	Gly	Ala	Leu	Asp	Glu	Val	Asp	Ser	
		50				55					60					
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Arg	Gly	Tyr	Pro	Gln	Lys	Asn	Gly	Val	Leu	Leu	Arg	Trp	Gly	Asn	Glu	
	65				70			75						80		
gac	tgg	gcc	atc	gac	tgg	gcc	aag	atc	ttc	ggg	ccg	ggc	gtg	cgg	tcc	288
Asp	Trp	Ala	Ile	Asp	Trp	Ala	Lys	Ile	Phe	Gly	Pro	Gly	Val	Arg	Ser	
				85				90						95		
tgg	cag	gtc	gac	cgg	gac	gac	ttc	gac	cac	gtc	ctg	ctc	aac	aac	gcc	336
Trp	Gln	Val	Asp	Arg	Asp	Asp	Phe	Asp	His	Val	Leu	Leu	Asn	Asn	Ala	
			100					105					110			
ggc	aag	cag	ggc	gcc	aag	atc	atc	cag	ggc	gcg	gct	gtc	aag	cgg	gtg	384
Gly	Lys	Gln	Gly	Ala	Lys	Ile	Ile	Gln	Gly	Ala	Ala	Val	Lys	Arg	Val	

115					120					125						
ttg	ttc	gac	ggg	gag	cgg	gcc	acc	gcc	gcc	gag	tgg	ttc	gac	ccc	gag	432
Leu	Phe	Asp	Gly	Glu	Arg	Ala	Thr	Ala	Ala	Glu	Trp	Phe	Asp	Pro	Glu	
	130					135					140					
tcg	ggg	gag	gtc	cgc	acc	atc	gat	ttc	gac	tac	gtg	gtc	gac	gcg	tcc	480
Ser	Gly	Glu	Val	Arg	Thr	Ile	Asp	Phe	Asp	Tyr	Val	Val	Asp	Ala	Ser	
145					150					155					160	
ggc	cgg	gcc	ggg	ctg	atc	ccg	tcc	cag	cac	ttc	aag	cac	cgg	cgc	ccc	528
Gly	Arg	Ala	Gly	Leu	Ile	Pro	Ser	Gln	His	Phe	Lys	His	Arg	Arg	Pro	
				165					170					175		
acc	gag	acg	ttc	aag	aac	gtg	gcc	atc	tgg	ggc	tac	tgg	cag	ggg	ggc	576
Thr	Glu	Thr	Phe	Lys	Asn	Val	Ala	Ile	Trp	Gly	Tyr	Trp	Gln	Gly	Gly	
			180					185					190			
tcg	ctg	ctg	ccg	aac	tct	ccc	tcc	ggc	ggg	atc	aac	gtc	atc	tcc	gcg	624
Ser	Leu	Leu	Pro	Asn	Ser	Pro	Ser	Gly	Gly	Ile	Asn	Val	Ile	Ser	Ala	
		195				200						205				
ccc	gac	ggc	tgg	tac	tgg	gtc	att	ccg	ctg	cgc	ggc	gac	cgg	tac	agc	672
Pro	Asp	Gly	Trp	Tyr	Trp	Val	Ile	Pro	Leu	Arg	Gly	Asp	Arg	Tyr	Ser	
	210					215					220					
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Ile	Gly	Phe	Val	Cys	His	Gln	Ser	Arg	Phe	Leu	Glu	Arg	Arg	Lys	Glu	
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cac	gcc	tcg	ctg	gag	gac	atg	ctc	gcc	gca	ctg	gta	cag	gag	tcc	ccg	768
His	Ala	Ser	Leu	Glu	Asp	Met	Leu	Ala	Ala	Leu	Val	Gln	Glu	Ser	Pro	
				245					250					255		
acc	gtg	cgc	ggc	ctg	acg	gcg	aac	ggg	acg	tac	cag	ccg	ggc	gtg	cgg	816
Thr	Val	Arg	Gly	Leu	Thr	Ala	Asn	Gly	Thr	Tyr	Gln	Pro	Gly	Val	Arg	
			260					265					270			
gtg	gag	cag	gac	ttc	tcg	tac	atc	tcc	gac	agc	ttc	tgc	ggg	ccc	ggc	864
Val	Glu	Gln	Asp	Phe	Ser	Tyr	Ile	Ser	Asp	Ser	Phe	Cys	Gly	Pro	Gly	
		275				280						285				
tac	ttc	gcg	gcc	ggc	gac	tcc	gcc	tgc	ttc	ctg	gac	cca	ctg	ctg	tcc	912
Tyr	Phe	Ala	Ala	Gly	Asp	Ser	Ala	Cys	Phe	Leu	Asp	Pro	Leu	Leu	Ser	
	290					295					300					
acc	ggc	gtg	cac	ctc	gcc	ctc	tac	agc	ggc	atg	ctc	gcc	tcg	gcg	tcc	960
Thr	Gly	Val	His	Leu	Ala	Leu	Tyr	Ser	Gly	Met	Leu	Ala	Ser	Ala	Ser	
305					310					315					320	
atc	ctg	gcc	acc	atc	cac	ggg	gac	gtc	acc	gag	gag	gag	gcg	cgg	gcg	1008
Ile	Leu	Ala	Thr	Ile	His	Gly	Asp	Val	Thr	Glu	Glu	Glu	Ala	Arg	Ala	
				325					330					335		
ttc	tac	gag	tcc	ctc	tac	cgc	aac	gcc	tac	cag	cgc	ctg	ttc	acc	ctc	1056
Phe	Tyr	Glu	Ser	Leu	Tyr	Arg	Asn	Ala	Tyr	Gln	Arg	Leu	Phe	Thr	Leu	
			340					345					350			
gtc	gcc	ggc	gtc	tac	cag	cag	cag	gcc	ggc	aag	agg	gca	tac	ttc	ggc	1104
Val	Ala	Gly	Val	Tyr	Gln	Gln	Gln	Ala	Gly	Lys	Arg	Ala	Tyr	Phe	Gly	
		355					360					365				
ctg	gcc	gac	gcg	ctg	gtg	cac	gac	agc	ggc	gaa	ccc	gag	tac	gag	aag	1152
Leu	Ala	Asp	Ala	Leu	Val	His	Asp	Ser	Gly	Glu	Pro	Glu	Tyr	Glu	Lys	
	370					375					380					

gta gac ggg gcc cgc gcc ttc gcc cag ctc gtc gcc ggc ctc gcc gac 1200
 Val Asp Gly Ala Arg Ala Phe Ala Gln Leu Val Ala Gly Leu Ala Asp
 385 390 395 400

ctg gac gac gcg gcg gag gga cgg cac gac agc acc gcg gcg gcg gca 1248
 Leu Asp Asp Ala Ala Glu Gly Arg His Asp Ser Thr Ala Ala Ala Ala
 405 410 415

ccg gcg gag cag gac aac tcc gtc cgg cag ctc ttc ctg gcc gcc gag 1296
 Pro Ala Glu Gln Asp Asn Ser Val Arg Gln Leu Phe Leu Ala Ala Glu
 420 425 430

gag gcc cgc cgg atg gcc gac gcg cgc acg ccg agc gcc ccg gtc agc 1344
 Glu Ala Arg Arg Met Ala Asp Ala Arg Thr Pro Ser Ala Pro Val Ser
 435 440 445

gag gcg ccg ggc aag ctc gac agc cac gac ctc ttc gac tcg gca acc 1392
 Glu Ala Pro Gly Lys Leu Asp Ser His Asp Leu Phe Asp Ser Ala Thr
 450 455 460

ggc ctc tac ctg gtc acc acc ccg cga ctg ggg atc cgc cgg gcc aag 1440
 Gly Leu Tyr Leu Val Thr Thr Pro Arg Leu Gly Ile Arg Arg Ala Lys
 465 470 475 480

ccg gcc gac acg cag gcg gcg gca gag cag tct gcc 1476
 Pro Ala Asp Thr Gln Ala Ala Ala Glu Gln Ser Ala
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Lys Glu Thr Phe Pro Arg Tyr His Ile Gly Glu Ser Ile Ala Ser Ser
 35 40 45

Cys Arg Thr Ile Val Asp Phe Val Gly Ala Leu Asp Glu Val Asp Ser
 50 55 60

Arg Gly Tyr Pro Gln Lys Asn Gly Val Leu Leu Arg Trp Gly Asn Glu
 65 70 75 80

Asp Trp Ala Ile Asp Trp Ala Lys Ile Phe Gly Pro Gly Val Arg Ser
 85 90 95

Trp Gln Val Asp Arg Asp Asp Phe Asp His Val Leu Leu Asn Asn Ala
 100 105 110

Gly Lys Gln Gly Ala Lys Ile Ile Gln Gly Ala Ala Val Lys Arg Val
 115 120 125

Leu Phe Asp Gly Glu Arg Ala Thr Ala Ala Glu Trp Phe Asp Pro Glu
 130 135 140

Ser Gly Glu Val Arg Thr Ile Asp Phe Asp Tyr Val Val Asp Ala Ser
 145 150 155 160
 Gly Arg Ala Gly Leu Ile Pro Ser Gln His Phe Lys His Arg Arg Pro
 165 170 175
 Thr Glu Thr Phe Lys Asn Val Ala Ile Trp Gly Tyr Trp Gln Gly Gly
 180 185 190
 Ser Leu Leu Pro Asn Ser Pro Ser Gly Gly Ile Asn Val Ile Ser Ala
 195 200 205
 Pro Asp Gly Trp Tyr Trp Val Ile Pro Leu Arg Gly Asp Arg Tyr Ser
 210 215 220
 Ile Gly Phe Val Cys His Gln Ser Arg Phe Leu Glu Arg Arg Lys Glu
 225 230 235 240
 His Ala Ser Leu Glu Asp Met Leu Ala Ala Leu Val Gln Glu Ser Pro
 245 250 255
 Thr Val Arg Gly Leu Thr Ala Asn Gly Thr Tyr Gln Pro Gly Val Arg
 260 265 270
 Val Glu Gln Asp Phe Ser Tyr Ile Ser Asp Ser Phe Cys Gly Pro Gly
 275 280 285
 Tyr Phe Ala Ala Gly Asp Ser Ala Cys Phe Leu Asp Pro Leu Leu Ser
 290 295 300
 Thr Gly Val His Leu Ala Leu Tyr Ser Gly Met Leu Ala Ser Ala Ser
 305 310 315 320
 Ile Leu Ala Thr Ile His Gly Asp Val Thr Glu Glu Glu Ala Arg Ala
 325 330 335
 Phe Tyr Glu Ser Leu Tyr Arg Asn Ala Tyr Gln Arg Leu Phe Thr Leu
 340 345 350
 Val Ala Gly Val Tyr Gln Gln Gln Ala Gly Lys Arg Ala Tyr Phe Gly
 355 360 365
 Leu Ala Asp Ala Leu Val His Asp Ser Gly Glu Pro Glu Tyr Glu Lys
 370 375 380
 Val Asp Gly Ala Arg Ala Phe Ala Gln Leu Val Ala Gly Leu Ala Asp
 385 390 395 400
 Leu Asp Asp Ala Ala Glu Gly Arg His Asp Ser Thr Ala Ala Ala Ala
 405 410 415
 Pro Ala Glu Gln Asp Asn Ser Val Arg Gln Leu Phe Leu Ala Ala Glu
 420 425 430
 Glu Ala Arg Arg Met Ala Asp Ala Arg Thr Pro Ser Ala Pro Val Ser
 435 440 445
 Glu Ala Pro Gly Lys Leu Asp Ser His Asp Leu Phe Asp Ser Ala Thr
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 Gly Leu Tyr Leu Val Thr Thr Pro Arg Leu Gly Ile Arg Arg Ala Lys
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 Pro Ala Asp Thr Gln Ala Ala Ala Glu Gln Ser Ala

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490

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 Ala Ser Pro Ala Asn Pro His Ala Gly His Ala Ala Pro Val Pro Ser
 20 25 30
 cgg gtc agc acg acc acg gtc gcg gtc acc ccg ttc acc gag ccg atg 144
 Arg Val Ser Thr Thr Thr Val Ala Val Thr Pro Phe Thr Glu Pro Met
 35 40 45
 ccc gtc ccg ccg cgg ctg acc ccg gtc tcc cgc cgc gac ggc atc gac 192
 Pro Val Pro Pro Arg Leu Thr Pro Val Ser Arg Arg Asp Gly Ile Asp
 50 55 60
 gtc tac gag atc ccc atc cgg ccg gcg cag gtg cag atc ctg ccc ggc 240
 Val Tyr Glu Ile Pro Ile Arg Pro Ala Gln Val Gln Ile Leu Pro Gly
 65 70 75 80
 ctg ctc acg ccc gcc tac acc tac gcc ggt tcc ttc gtc ggc ccc acc 288
 Leu Leu Thr Pro Ala Tyr Thr Tyr Ala Gly Ser Phe Val Gly Pro Thr
 85 90 95
 atc cgg gcc cgc acg ggc cgg ccc gtg cgg atc acc tac acc aac ggc 336
 Ile Arg Ala Arg Thr Gly Arg Pro Val Arg Ile Thr Tyr Thr Asn Gly
 100 105 110
 ctc gac acc cac gcc aac gtg cac ctg cac ggc ggg cac gtg ccg gcc 384
 Leu Asp Thr His Ala Asn Val His Leu His Gly Gly His Val Pro Ala
 115 120 125
 acc agc gac ggt cac ccg atg gac ctg atc ccg ccg ggc ggc tcg aag 432
 Thr Ser Asp Gly His Pro Met Asp Leu Ile Pro Pro Gly Gly Ser Lys
 130 135 140
 gtc tac gac tac ccg aac ctt cag cgc ggc gcg acg ctc tgg tac cac 480
 Val Tyr Asp Tyr Pro Asn Leu Gln Arg Gly Ala Thr Leu Trp Tyr His
 145 150 155 160
 gac cac acc cac gcc tac gag gcc gac cac gtc tac cgc gga ctg cac 528
 Asp His Thr His Ala Tyr Glu Ala Asp His Val Tyr Arg Gly Leu His
 165 170 175
 ggc ttc tat ctg atc gac gac ccg gcc gag cat cac ctg cgc ctg ccc 576
 Gly Phe Tyr Leu Ile Asp Asp Pro Ala Glu His His Leu Arg Leu Pro
 180 185 190

gcc	ggc	aag	tac	gac	gtg	ccg	atc	atg	ctg	cgc	aac	gcc	cag	ttc	gac	624
Ala	Gly	Lys	Tyr	Asp	Val	Pro	Ile	Met	Leu	Arg	Asn	Ala	Gln	Phe	Asp	
		195					200					205				
gac	tcc	ggc	gcc	ctc	gtc	ttc	ggc	cac	ccg	gac	gac	cgg	gtc	acc	atc	672
Asp	Ser	Gly	Ala	Leu	Val	Phe	Gly	His	Pro	Asp	Asp	Arg	Val	Thr	Ile	
	210					215					220					
ctg	gcg	aac	ggc	aag	gcc	cag	ccc	tac	ttc	gag	gtg	gcc	ccg	cgc	agg	720
Leu	Ala	Asn	Gly	Lys	Ala	Gln	Pro	Tyr	Phe	Glu	Val	Ala	Pro	Arg	Arg	
225					230					235					240	
tac	cgg	ttc	cgc	ctg	ctc	aac	gcg	gcg	ctg	aag	cac	gtc	ttc	cgg	ctc	768
Tyr	Arg	Phe	Arg	Leu	Leu	Asn	Ala	Ala	Leu	Lys	His	Val	Phe	Arg	Leu	
				245					250					255		
aac	ctg	ggc	ggc	gaa	ccg	ctc	acc	cgc	atc	gcc	acg	gac	ggc	ggg	ctg	816
Asn	Leu	Gly	Gly	Glu	Pro	Leu	Thr	Arg	Ile	Ala	Thr	Asp	Gly	Gly	Leu	
			260					265					270			
ctg	ccc	gcc	ccc	acc	agt	cac	acc	gag	ctg	gcg	ctc	tcc	tcc	ggg	gag	864
Leu	Pro	Ala	Pro	Thr	Ser	His	Thr	Glu	Leu	Ala	Leu	Ser	Ser	Gly	Glu	
		275					280					285				
cgg	gtc	gag	att	gtg	atc	gac	ttc	gcc	gag	cac	gca	ggc	ggc	ggg	ccg	912
Arg	Val	Glu	Ile	Val	Ile	Asp	Phe	Ala	Glu	His	Ala	Gly	Gly	Gly	Pro	
	290					295					300					
gtc	tac	ctc	tac	gac	ggg	gac	aac	ccg	atc	ctg	cgc	ttc	gac	gtg	tcg	960
Val	Tyr	Leu	Tyr	Asp	Gly	Asp	Asn	Pro	Ile	Leu	Arg	Phe	Asp	Val	Ser	
305					310					315					320	
tcc	cgg	gcg	gtc	acc	gac	ccc	agc	cgg	gtg	ccg	gtc	acc	ctg	cgc	gca	1008
Ser	Arg	Ala	Val	Thr	Asp	Pro	Ser	Arg	Val	Pro	Val	Thr	Leu	Arg	Ala	
				325					330					335		
ctg	ccc	ccg	atg	ggc	acg	ccg	acc	gtg	gag	cgc	acc	gtg	tcg	atg	agc	1056
Leu	Pro	Pro	Met	Gly	Thr	Pro	Thr	Val	Glu	Arg	Thr	Val	Ser	Met	Ser	
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ttc	gac	atg	tcg	gcc	cgg	ccc	ccg	atc	gcg	ctc	atg	gac	ggc	aaa	ccg	1104
Phe	Asp	Met	Ser	Ala	Arg	Pro	Pro	Ile	Ala	Leu	Met	Asp	Gly	Lys	Pro	
		355					360					365				
ttc	gac	cct	ctc	cgg	gtg	gac	gta	cag	gtc	aag	cgg	ggc	agc	acc	gag	1152
Phe	Asp	Pro	Leu	Arg	Val	Asp	Val	Gln	Val	Lys	Arg	Gly	Ser	Thr	Glu	
	370					375					380					
atc	tgg	aac	gtg	gtc	aac	gcg	gat	acc	gat	ccg	ttc	ccc	ttc	gac	cat	1200
Ile	Trp	Asn	Val	Val	Asn	Ala	Asp	Thr	Asp	Pro	Phe	Pro	Phe	Asp	His	
385					390					395					400	
ccg	ttc	cac	ctg	cac	ctg	gtg	acg	ttc	cgg	gtg	ctc	ggc	cgc	gac	ggc	1248
Pro	Phe	His	Leu	His	Leu	Val	Thr	Phe	Arg	Val	Leu	Gly	Arg	Asp	Gly	
				405					410					415		
ggg	ccg	ccc	gcg	ccg	gag	gac	gcc	ggg	ctc	aag	gac	acc	gtc	tac	gtc	1296
Gly	Pro	Pro	Ala	Pro	Glu	Asp	Ala	Gly	Leu	Lys	Asp	Thr	Val	Tyr	Val	
			420					425					430			
tcg	ccc	aag	ggg	tct	gtc	aag	atc	cag	gtc	acc	ttc	gcc	acg	ccg	tac	1344
Ser	Pro	Lys	Gly	Ser	Val	Lys	Ile	Gln	Val	Thr	Phe	Ala	Thr	Pro	Tyr	
		435					440					445				
ctc	ggg	cag	tac	gtc	tac	cac	tgc	cac	tac	ctg	gag	cac	tcg	tcg	ctg	1392

Leu Gly Gln Tyr Val Tyr His Cys His Tyr Leu Glu His Ser Ser Leu
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 Gly Met Met Ala Gln Leu Glu Val Val Pro
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1422

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Arg Val Ser Thr Thr Thr Val Ala Val Thr Pro Phe Thr Glu Pro Met
 35 40 45

Pro Val Pro Pro Arg Leu Thr Pro Val Ser Arg Arg Asp Gly Ile Asp
 50 55 60

Val Tyr Glu Ile Pro Ile Arg Pro Ala Gln Val Gln Ile Leu Pro Gly
 65 70 75 80

Leu Leu Thr Pro Ala Tyr Thr Tyr Ala Gly Ser Phe Val Gly Pro Thr
 85 90 95

Ile Arg Ala Arg Thr Gly Arg Pro Val Arg Ile Thr Tyr Thr Asn Gly
 100 105 110

Leu Asp Thr His Ala Asn Val His Leu His Gly Gly His Val Pro Ala
 115 120 125

Thr Ser Asp Gly His Pro Met Asp Leu Ile Pro Pro Gly Gly Ser Lys
 130 135 140

Val Tyr Asp Tyr Pro Asn Leu Gln Arg Gly Ala Thr Leu Trp Tyr His
 145 150 155 160

Asp His Thr His Ala Tyr Glu Ala Asp His Val Tyr Arg Gly Leu His
 165 170 175

Gly Phe Tyr Leu Ile Asp Asp Pro Ala Glu His His Leu Arg Leu Pro
 180 185 190

Ala Gly Lys Tyr Asp Val Pro Ile Met Leu Arg Asn Ala Gln Phe Asp
 195 200 205

Asp Ser Gly Ala Leu Val Phe Gly His Pro Asp Asp Arg Val Thr Ile
 210 215 220

Leu Ala Asn Gly Lys Ala Gln Pro Tyr Phe Glu Val Ala Pro Arg Arg
 225 230 235 240

Tyr Arg Phe Arg Leu Leu Asn Ala Ala Leu Lys His Val Phe Arg Leu
 245 250 255

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Leu	Pro	Ala	Pro	Thr	Ser	His	Thr	Glu	Leu	Ala	Leu	Ser	Ser	Gly	Glu	
			275				280					285				
Arg	Val	Glu	Ile	Val	Ile	Asp	Phe	Ala	Glu	His	Ala	Gly	Gly	Gly	Pro	
			290				295				300					
Val	Tyr	Leu	Tyr	Asp	Gly	Asp	Asn	Pro	Ile	Leu	Arg	Phe	Asp	Val	Ser	
			305				310				315				320	
Ser	Arg	Ala	Val	Thr	Asp	Pro	Ser	Arg	Val	Pro	Val	Thr	Leu	Arg	Ala	
				325				330				335				
Leu	Pro	Pro	Met	Gly	Thr	Pro	Thr	Val	Glu	Arg	Thr	Val	Ser	Met	Ser	
			340				345				350					
Phe	Asp	Met	Ser	Ala	Arg	Pro	Pro	Ile	Ala	Leu	Met	Asp	Gly	Lys	Pro	
			355				360				365					
Phe	Asp	Pro	Leu	Arg	Val	Asp	Val	Gln	Val	Lys	Arg	Gly	Ser	Thr	Glu	
			370				375				380					
Ile	Trp	Asn	Val	Val	Asn	Ala	Asp	Thr	Asp	Pro	Phe	Pro	Phe	Asp	His	
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Pro	Phe	His	Leu	His	Leu	Val	Thr	Phe	Arg	Val	Leu	Gly	Arg	Asp	Gly	
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Gly	Pro	Pro	Ala	Pro	Glu	Asp	Ala	Gly	Leu	Lys	Asp	Thr	Val	Tyr	Val	
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Ser	Pro	Lys	Gly	Ser	Val	Lys	Ile	Gln	Val	Thr	Phe	Ala	Thr	Pro	Tyr	
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Leu	Gly	Gln	Tyr	Val	Tyr	His	Cys	His	Tyr	Leu	Glu	His	Ser	Ser	Leu	
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gag	gag	cgg	ggc	ctc	ggc	cgg	gtc	gag	cac	cgc	cgg	cac	cgc	gag	gtg	96
Glu	Glu	Arg	Gly	Leu	Gly	Arg	Val	Glu	His	Arg	Arg	His	Arg	Glu	Val	
			20					25					30			

tgg	ttc	tcc	gcc	gcc	agc	gcg	gag	ccg	cgc	ctg	ctg	gat	ctg	cgt	acc	144
Trp	Phe	Ser	Ala	Ala	Ser	Ala	Glu	Pro	Arg	Leu	Leu	Asp	Leu	Arg	Thr	
		35					40					45				
gtc	gac	gac	ctg	ttc	ctg	ctc	gtc	gcc	gtc	gcc	gac	ggc	gtc	ggc	cac	192
Val	Asp	Asp	Leu	Phe	Leu	Leu	Val	Ala	Val	Ala	Asp	Gly	Val	Gly	His	
	50					55					60					
acc	aag	gcg	gac	ctg	gcg	gcc	ttc	acc	cgg	ctg	gcc	cgg	gcg	gcg	gcg	240
Thr	Lys	Ala	Asp	Leu	Ala	Ala	Phe	Thr	Arg	Leu	Ala	Arg	Ala	Ala	Ala	
	65				70					75					80	
ctg	ccg	gcg	gtg	ctg	ccg	gcc	cgc	gcc	gcc	tgc	ggc	gtg	ccc	ggg	cgg	288
Leu	Pro	Ala	Val	Leu	Pro	Ala	Arg	Ala	Ala	Cys	Gly	Val	Pro	Gly	Arg	
				85					90					95		
ccg	gcg	acc	gtg	gac	gtc	gcc	gcc	tcc	ttc	ctc	ggc	cgc	cgc	aac	tac	336
Pro	Ala	Thr	Val	Asp	Val	Ala	Ala	Ser	Phe	Leu	Gly	Arg	Arg	Asn	Tyr	
			100					105					110			
aac	cgg	tac	gac	atc	gag	gac	gcc	gtg	ggg	cgg	cac	gcg	gtg	gcc	gcg	384
Asn	Arg	Tyr	Asp	Ile	Glu	Asp	Ala	Val	Gly	Arg	His	Ala	Val	Ala	Ala	
		115					120					125				
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Leu	Gly	Leu	Arg	Tyr	His	Ser	Arg	Arg	Gly	Gly	Glu	Ala	Pro	Pro	Glu	
	130					135					140					
ggc	ggg	ctg	tcg	ctg	cgg	gtc	acc	gtc	gag	ggc	acc	cag	gcg	acg	ctg	480
Gly	Gly	Leu	Ser	Leu	Arg	Val	Thr	Val	Glu	Gly	Thr	Gln	Ala	Thr	Leu	
	145				150					155					160	
gcg	gta	cgg	gtg	gcc	gac	cgg	ccg	ctg	cac	cgg	cgg	gcc	tac	aag	cgg	528
Ala	Val	Arg	Val	Ala	Asp	Arg	Pro	Leu	His	Arg	Arg	Ala	Tyr	Lys	Arg	
				165					170					175		
tcg	tcc	acg	ccg	ggg	acc	ctg	cat	ccg	ccg	ctc	gcc	gcg	gcg	ctg	gcc	576
Ser	Ser	Thr	Pro	Gly	Thr	Leu	His	Pro	Pro	Leu	Ala	Ala	Ala	Leu	Ala	
			180					185					190			
tgg	ctg	gcc	ggc	atc	cgc	ccc	ggg	atg	ctg	gtg	gcc	gat	ccg	tgc	tgc	624
Trp	Leu	Ala	Gly	Ile	Arg	Pro	Gly	Met	Leu	Val	Ala	Asp	Pro	Cys	Cys	
		195					200					205				
ggc	acc	ggc	acg	atc	ccc	gtg	gag	gca	gcc	ggg	ctg	gca	ccg	ggg	gcg	672
Gly	Thr	Gly	Thr	Ile	Pro	Val	Glu	Ala	Ala	Gly	Leu	Ala	Pro	Gly	Ala	
	210					215					220					
gtg	ctg	ttc	ggc	tcg	gac	cac	gac	ccg	gag	acg	gtc	ggc	gcg	gcc	gtc	720
Val	Leu	Phe	Gly	Ser	Asp	His	Asp	Pro	Glu	Thr	Val	Gly	Ala	Ala	Val	
	225				230					235					240	
gcc	aac	tcg	gcg	gcg	tcg	ggg	gcc	cgc	gtc	acc	tgg	gcg	gtc	gcc	gac	768
Ala	Asn	Ser	Ala	Ala	Ser	Gly	Ala	Arg	Val	Thr	Trp	Ala	Val	Ala	Asp	
				245				250						255		
gcc	gga	cga	ttg	ccg	ctg	cgg	acc	ggc	cgg	gtg	gac	cgg	gtg	gtc	agc	816
Ala	Gly	Arg	Leu	Pro	Leu	Arg	Thr	Gly	Arg	Val	Asp	Arg	Val	Val	Ser	
			260					265					270			
aat	ccg	ccc	tgg	gac	cgg	cag	gtg	cag	gcg	cgg	ggc	gtg	ctc	gcc	ggc	864
Asn	Pro	Pro	Trp	Asp	Arg	Gln	Val	Gln	Ala	Arg	Gly	Val	Leu	Ala	Gly	
		275					280					285				
gat	tcc	ggc	cgc	ctc	ttc	gcg	gag	ctg	cgc	cgg	gtg	acg	gtc	gac	ggc	912

Asp	Ser	Gly	Arg	Leu	Phe	Ala	Glu	Leu	Arg	Arg	Val	Thr	Val	Asp	Gly	
290						295					300					
ggg	cgg	gcg	gta	ctg	ctg	ctg	cac	gag	ttc	gcc	gac	cag	gcc	gac	ctg	960
Gly	Arg	Ala	Val	Leu	Leu	Leu	His	Glu	Phe	Ala	Asp	Gln	Ala	Asp	Leu	
305					310					315					320	
gcc	cgc	gcc	gcc	ggg	ttc	ggg	gtg	ggc	gac	gtg	cgg	ccg	gtc	agc	ctg	1008
Ala	Arg	Ala	Ala	Gly	Phe	Gly	Val	Gly	Asp	Val	Arg	Pro	Val	Ser	Leu	
				325					330					335		
ttc	ggc	gcc	cac	ccc	tcg	atc	gtc	gac	ctg	cac	ggc					1044
Phe	Gly	Ala	His	Pro	Ser	Ile	Val	Asp	Leu	His	Gly					
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 <212> PRT
 <213> Micromonospora carbonacea

<220>
 <223> evrH

<400> 41
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 Glu Glu Arg Gly Leu Gly Arg Val Glu His Arg Arg His Arg Glu Val
 20 25 30
 Trp Phe Ser Ala Ala Ser Ala Glu Pro Arg Leu Leu Asp Leu Arg Thr
 35 40 45
 Val Asp Asp Leu Phe Leu Leu Val Ala Val Ala Asp Gly Val Gly His
 50 55 60
 Thr Lys Ala Asp Leu Ala Ala Phe Thr Arg Leu Ala Arg Ala Ala Ala
 65 70 75 80
 Leu Pro Ala Val Leu Pro Ala Arg Ala Ala Cys Gly Val Pro Gly Arg
 85 90 95
 Pro Ala Thr Val Asp Val Ala Ala Ser Phe Leu Gly Arg Arg Asn Tyr
 100 105 110
 Asn Arg Tyr Asp Ile Glu Asp Ala Val Gly Arg His Ala Val Ala Ala
 115 120 125
 Leu Gly Leu Arg Tyr His Ser Arg Arg Gly Gly Glu Ala Pro Pro Glu
 130 135 140
 Gly Gly Leu Ser Leu Arg Val Thr Val Glu Gly Thr Gln Ala Thr Leu
 145 150 155 160
 Ala Val Arg Val Ala Asp Arg Pro Leu His Arg Arg Ala Tyr Lys Arg
 165 170 175
 Ser Ser Thr Pro Gly Thr Leu His Pro Pro Leu Ala Ala Ala Leu Ala
 180 185 190
 Trp Leu Ala Gly Ile Arg Pro Gly Met Leu Val Ala Asp Pro Cys Cys
 195 200 205
 Gly Thr Gly Thr Ile Pro Val Glu Ala Ala Gly Leu Ala Pro Gly Ala

210	215	220
Val Leu Phe Gly Ser Asp His Asp Pro Glu Thr Val Gly Ala Ala Val		
225	230	235 240
Ala Asn Ser Ala Ala Ser Gly Ala Arg Val Thr Trp Ala Val Ala Asp		
	245	250 255
Ala Gly Arg Leu Pro Leu Arg Thr Gly Arg Val Asp Arg Val Val Ser		
	260	265 270
Asn Pro Pro Trp Asp Arg Gln Val Gln Ala Arg Gly Val Leu Ala Gly		
	275	280 285
Asp Ser Gly Arg Leu Phe Ala Glu Leu Arg Arg Val Thr Val Asp Gly		
	290	295 300
Gly Arg Ala Val Leu Leu Leu His Glu Phe Ala Asp Gln Ala Asp Leu		
	305	310 315 320
Ala Arg Ala Ala Gly Phe Gly Val Gly Asp Val Arg Pro Val Ser Leu		
	325	330 335
Phe Gly Ala His Pro Ser Ile Val Asp Leu His Gly		
	340	345

<210> 42
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<220>
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<220>
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Met Pro His Gly Pro Val Arg Arg Asn Arg Gly Asp Cys Ala Val Arg	
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aca ccg gat ctg ttc atc ggc gcc gtc ggc gcc ttc gtc ccg ccg acg	96
Thr Pro Asp Leu Phe Ile Gly Ala Val Gly Ala Phe Val Pro Pro Thr	
20 25 30	
gtg agc gtc gag tgg gcg atc gac cgc ggt ctt tac tcc cgc gag cag	144
Val Ser Val Glu Trp Ala Ile Asp Arg Gly Leu Tyr Ser Arg Glu Gln	
35 40 45	
gtg gag ctg cac gag ctg gcg ggc acg gcc atc gcc ggc gac ctg ccc	192
Val Glu Leu His Glu Leu Ala Gly Thr Ala Ile Ala Gly Asp Leu Pro	
50 55 60	
gcg ccg gag atg gcg ctg cgc gcc gcc caa cag gcg gtc aag cgc tgg	240
Ala Pro Glu Met Ala Leu Arg Ala Ala Gln Gln Ala Val Lys Arg Trp	
65 70 75 80	
ggc ggc tcg ccg acg gag ttc gac ctg ctg ctc tac gcc agc acc tgg	288
Gly Gly Ser Pro Thr Glu Phe Asp Leu Leu Leu Tyr Ala Ser Thr Trp	
85 90 95	

[illegible]

Ser Pro Thr Trp Arg Glu
355

<210> 43

<211> 358

<212> PRT

<213> Micromonospora carbonacea

<220>

<223> evrI

<400> 43

Met	Pro	His	Gly	Pro	Val	Arg	Arg	Asn	Arg	Gly	Asp	Cys	Ala	Val	Arg	1	5	10	15
Thr	Pro	Asp	Leu	Phe	Ile	Gly	Ala	Val	Gly	Ala	Phe	Val	Pro	Pro	Thr	20	25	30	
Val	Ser	Val	Glu	Trp	Ala	Ile	Asp	Arg	Gly	Leu	Tyr	Ser	Arg	Glu	Gln	35	40	45	
Val	Glu	Leu	His	Glu	Leu	Ala	Gly	Thr	Ala	Ile	Ala	Gly	Asp	Leu	Pro	50	55	60	
Ala	Pro	Glu	Met	Ala	Leu	Arg	Ala	Ala	Gln	Gln	Ala	Val	Lys	Arg	Trp	65	70	75	80
Gly	Gly	Ser	Pro	Thr	Glu	Phe	Asp	Leu	Leu	Leu	Tyr	Ala	Ser	Thr	Trp	85	90	95	
His	Gln	Gly	Pro	Asp	Gly	Trp	Pro	Pro	His	Ser	Tyr	Leu	Gln	Arg	His	100	105	110	
Leu	Val	Gly	Gly	Asp	Leu	Leu	Ala	Leu	Glu	Ile	Arg	Gln	Gly	Cys	Asn	115	120	125	
Gly	Met	Phe	Ser	Ala	Phe	Glu	Leu	Ala	Ala	Ser	His	Leu	Gln	Ala	Val	130	135	140	
Pro	Glu	Arg	Thr	Ser	Ala	Leu	Leu	Val	Ala	Ala	Asp	Asn	Tyr	Gly	Thr	145	150	155	160
Pro	Met	Val	Asp	Arg	Trp	Arg	Met	Gly	Pro	Gly	Phe	Ile	Gly	Gly	Asp	165	170	175	
Ala	Gly	Ser	Ala	Leu	Ile	Leu	Thr	Lys	Arg	Pro	Gly	Phe	Ala	Arg	Leu	180	185	190	
Arg	Ser	Val	Cys	Thr	Lys	Ser	Val	Pro	Glu	Ala	Glu	Arg	Leu	His	Arg	195	200	205	
Gly	Asp	Glu	Pro	Leu	Phe	Pro	Pro	Ser	Val	Leu	Thr	Gly	Arg	Glu	Leu	210	215	220	
Asn	Phe	Thr	Ala	Arg	Ile	Asp	Gln	Gln	Phe	Ala	Ala	Arg	Ser	Pro	Ala	225	230	235	240
Ser	Ile	Ala	Met	Ala	Asp	Val	Gly	Asp	His	Ile	Glu	Glu	Val	Val	Gly	245	250	255	
Arg	Ala	Leu	Ala	Glu	Ala	Glu	Ile	Glu	Val	Gly	Asp	Leu	Ala	Arg	Val	260	265	270	
Ala	Phe	Met	Asn	Phe	Ser	Arg	Glu	Ile	Met	Glu	Gln	Arg	Cys	Leu	Ala				

275	280	285
Asn Trp Gly Leu Pro Met Ser Arg Ser Thr Phe Asp Phe Gly Arg Arg		
290	295	300
Ile Gly His Cys Gly Ala Ser Asp Pro Leu Leu Ala Leu Glu His Leu		
305	310	315
Ala Arg Thr Gly Gly Leu Gly Pro Gly Asp His Leu Leu Thr Leu Gly		
	325	330
Thr Ala Pro Gly Val Val Val Ser Cys Ala Ile Val Gln Val Ile Glu		
	340	345
Ser Pro Thr Trp Arg Glu		
355		

<210> 44

<211> 3792

<212> DNA

<213> Micromonospora carbonacea

<220>

<221> CDS

<222> (1) .. (3792)

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<223> evrJ

<400> 44

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1 5 10 15	
gcc gtg gtg ggg atc ggc tgc cgg ttc ccg ggc gac gtc aac tcg ccc	96
Ala Val Val Gly Ile Gly Cys Arg Phe Pro Gly Asp Val Asn Ser Pro	
20 25 30	
gac gag ttc tgg gac ctg ctc acc ggg ggt cgc aac acc acc ggg acg	144
Asp Glu Phe Trp Asp Leu Leu Thr Gly Gly Arg Asn Thr Thr Gly Thr	
35 40 45	
gtg ccc gag gag cgc tgg agc gcg tac cgc gac ctg ggt ccg gcg ttc	192
Val Pro Glu Glu Arg Trp Ser Ala Tyr Arg Asp Leu Gly Pro Ala Phe	
50 55 60	
gag tcc gcg ctc cgg tcg gcc acc cgg gcg ggc aac ttc ctg gcc gac	240
Glu Ser Ala Leu Arg Ser Ala Thr Arg Ala Gly Asn Phe Leu Ala Asp	
65 70 75 80	
atc tcc ggc ttc gac gcg gac ttc ttc ggc atc tcc ccg cgc gag gcc	288
Ile Ser Gly Phe Asp Ala Asp Phe Phe Gly Ile Ser Pro Arg Glu Ala	
85 90 95	
gag ctg atg gac ccg cag cag cgg ctc atg ctg gag gtg acc tgg cag	336
Glu Leu Met Asp Pro Gln Gln Arg Leu Met Leu Glu Val Thr Trp Gln	
100 105 110	
gcg ctg gag gac gcc ggg atc ccg ccc cgc acc ctg gcc ggc acc gac	384
Ala Leu Glu Asp Ala Gly Ile Pro Pro Arg Thr Leu Ala Gly Thr Asp	
115 120 125	

gtc ggc gtc ttc gcc ggc gtg tgc acc tac gac tac ggc ggc cac cag	432
Val Gly Val Phe Ala Gly Val Cys Thr Tyr Asp Tyr Gly Gly His Gln	
130 135 140	
ttg gag gac ctg ccg cac atc gac gcc tgg acg ggc atc ggc gcc gcc	480
Leu Glu Asp Leu Pro His Ile Asp Ala Trp Thr Gly Ile Gly Ala Ala	
145 150 155 160	
acc tgc gcc gtc gcc aac cgg gtc tcc cac gtg ctc gac ctg cgc ggg	528
Thr Cys Ala Val Ala Asn Arg Val Ser His Val Leu Asp Leu Arg Gly	
165 170 175	
ccg agc ctg tcg atc gac acc gcc tgc tcg gcg tcg ctg gtc gcg ttg	576
Pro Ser Leu Ser Ile Asp Thr Ala Cys Ser Ala Ser Leu Val Ala Leu	
180 185 190	
cac ctc gcc gcg cag agc ctg cgg ctg ggc gag agc acg ctg gcc ctc	624
His Leu Ala Ala Gln Ser Leu Arg Leu Gly Glu Ser Thr Leu Ala Leu	
195 200 205	
gcc ggc ggg gtc aac ctg atc gtc acg ccc ggg cag tcg atc acc ctc	672
Ala Gly Gly Val Asn Leu Ile Val Thr Pro Gly Gln Ser Ile Thr Leu	
210 215 220	
ggc tcg gcc ggt gcc ctg gca ccc gac ggg cgc agc aag tcc ttc gac	720
Gly Ser Ala Gly Ala Leu Ala Pro Asp Gly Arg Ser Lys Ser Phe Asp	
225 230 235 240	
gcc acc gcc gac ggc tac ggt cgt ggc gag ggg tgc ggc gtc ctc gtg	768
Ala Thr Ala Asp Gly Tyr Gly Arg Gly Glu Gly Cys Gly Val Leu Val	
245 250 255	
ctc aag ctg ctc tcc gac gcc cag cgg gac ggg gac cgg gtg ctg gcc	816
Leu Lys Leu Leu Ser Asp Ala Gln Arg Asp Gly Asp Arg Val Leu Ala	
260 265 270	
gtg ctg cgg ggc agc gcc gtc aac cag gac ggc cgg acc aac ggg atc	864
Val Leu Arg Gly Ser Ala Val Asn Gln Asp Gly Arg Thr Asn Gly Ile	
275 280 285	
atg gca ccg tgc ggc cag gcc cag gag cac gtg atg gtc cgc gcc ctg	912
Met Ala Pro Cys Gly Gln Ala Gln Glu His Val Met Val Arg Ala Leu	
290 295 300	
cgc tcg gcc ggc atc gag gcc ggc agc gtc gac tac atc gag gcg cac	960
Arg Ser Ala Gly Ile Glu Ala Gly Ser Val Asp Tyr Ile Glu Ala His	
305 310 315 320	
ggc acc ggc acc ccg ctc ggt gac ccg atg gag gcc gcg gcg atc ggc	1008
Gly Thr Gly Thr Pro Leu Gly Asp Pro Met Glu Ala Ala Ala Ile Gly	
325 330 335	
tcg gtc tac ggg cag gac cgc ccg gac gac gag ccc tgc ctg atc ggt	1056
Ser Val Tyr Gly Gln Asp Arg Pro Asp Asp Glu Pro Cys Leu Ile Gly	
340 345 350	
tcg gtc aag tcc aac atc ggc cac ctg gag ggc gcg gcc ggc gtc gca	1104
Ser Val Lys Ser Asn Ile Gly His Leu Glu Gly Ala Ala Gly Val Ala	
355 360 365	
ggc gtc atc aag gcg gtc ctg gcg ctg aac cgg gcc gag gtg ccc gcc	1152
Gly Val Ile Lys Ala Val Leu Ala Leu Asn Arg Ala Glu Val Pro Ala	
370 375 380	
acc ctg ctg gtc acc gag gtc aac ccg gac atc gag tgg aag cgg ctg	1200

Thr 385	Leu	Leu	Val	Thr	Glu 390	Val	Asn	Pro	Asp	Ile 395	Glu	Trp	Lys	Arg	Leu 400	
cgg	ctg	cgc	ctg	gtc	acc	cgc	aac	cag	ccc	tgg	ccg	gac	cgg	ccg	ggg	1248
Arg	Leu	Arg	Leu	Val 405	Thr	Arg	Asn	Gln	Pro 410	Trp	Pro	Asp	Arg	Pro 415	Gly	
ccg	cgc	cgc	gcc	gga	gtc	tcc	ggc	ttc	ggc	tac	ggc	ggc	acc	gtg	gcg	1296
Pro	Arg	Arg	Ala 420	Gly	Val	Ser	Gly	Phe 425	Gly	Tyr	Gly	Gly	Thr 430	Val	Ala	
cac	gtg	gtg	ctg	gaa	cag	gcc	ccg	ccg	gtc	gcc	gcc	gag	ccg	gcc	ccg	1344
His	Val 435	Val	Leu	Glu	Gln	Ala	Pro 440	Pro	Val	Ala	Ala	Glu 445	Pro	Ala	Pro	
gcg	ctg	acc	ggc	gag	acg	ctg	ttc	ccg	atc	tcc	gcc	ggc	tcc	gcg	cac	1392
Ala	Leu 450	Thr	Gly	Glu	Thr	Leu 455	Phe	Pro	Ile	Ser	Ala 460	Gly	Ser	Ala	His	
tcc	ctt	cgc	gag	cgg	gcc	cgc	gcc	ctg	gcc	ggg	atc	gtc	ccg	gat	gtc	1440
Ser	Leu	Arg	Glu	Arg	Ala 470	Arg	Ala	Leu	Ala	Gly 475	Ile	Val	Pro	Asp	Val 480	
gac	ctc	gcc	gcg	ctc	ggg	cac	acc	ctg	gct	cgg	cgg	cgt	tcg	cac	ctg	1488
Asp	Leu	Ala	Ala 485	Leu	Gly	His	Thr	Leu 490	Ala	Arg	Arg	Arg	Ser	His 495	Leu	
acc	cac	cgg	gcg	gtg	gcg	gtg	gcc	gcc	ggc	cgg	gac	gac	ctg	gtc	gcg	1536
Thr	His	Arg	Ala 500	Val	Ala	Val	Ala	Ala 505	Gly	Arg	Asp	Asp	Leu 510	Val	Ala	
gcg	ttc	gcg	gcg	ctc	gcc	gac	gac	agg	ccg	cac	gac	cgg	gtg	cgt	acc	1584
Ala	Phe 515	Ala	Ala	Leu	Ala	Asp	Asp 520	Arg	Pro	His	Asp	Arg 525	Val	Arg	Thr	
gga	agc	ccg	gtg	gcg	gag	ccg	ccc	cgc	acg	gtg	tgg	gtg	ttc	tcc	ggg	1632
Gly	Ser 530	Pro	Val	Ala	Glu	Pro 535	Pro	Arg	Thr	Val	Trp 540	Val	Phe	Ser	Gly	
cac	ggg	tcg	cag	tgg	acg	ggc	atg	ggg	cgg	gaa	ctg	ctg	gcc	acg	gag	1680
His	Gly	Ser	Gln	Trp	Thr 550	Gly	Met	Gly	Arg	Glu 555	Leu	Leu	Ala	Thr	Glu 560	
ccg	gcc	ttc	gcg	gac	gcg	atc	gac	cgc	atc	gag	cag	atc	ttc	ctc	gac	1728
Pro	Ala	Phe	Ala 565	Asp	Ala	Ile	Asp	Arg	Ile 570	Glu	Gln	Ile	Phe	Leu 575	Asp	
gag	atc	ggt	ttc	tca	ccc	cgc	cag	gcg	atc	ctc	gac	ggc	gac	tac	gag	1776
Glu	Ile	Gly	Phe 580	Ser	Pro	Arg	Gln	Ala 585	Ile	Leu	Asp	Gly	Asp 590	Tyr	Glu	
gcc	gtc	gac	cgg	acc	cag	aca	atg	atc	ttc	gcg	atg	cag	ctc	ggc	ctg	1824
Ala	Val 595	Asp	Arg	Thr	Gln	Thr	Met 600	Ile	Phe	Ala	Met 605	Gln	Leu	Gly	Leu	
gcc	gag	atg	tgg	cga	gcg	agg	gga	gtc	gag	ccg	gac	gcg	gtg	atc	ggc	1872
Ala	Glu 610	Met	Trp	Arg	Ala	Arg	Gly 615	Val	Glu	Pro	Asp 620	Ala	Val	Ile	Gly	
cac	tcg	gtc	gga	gag	atc	gcc	gcg	gcg	gtg	acc	gcc	ggc	atc	ctg	acc	1920
His	Ser 625	Val	Gly	Glu	Ile 630	Ala	Ala	Ala	Val	Thr 635	Ala	Gly	Ile	Leu 640	Thr	
gtg	gcc	gac	ggc	gca	cgg	ctg	atc	tgc	cgt	cgt	tcc	ctg	ctg	ctg	cgc	1968
Val	Ala	Asp	Gly	Ala	Arg	Leu	Ile	Cys	Arg	Arg	Ser	Leu	Leu	Leu	Arg	

645								650					655				
gag	gtc	gcc	ggc	cag	ggc	gcg	atg	gcc	ctg	gtg	acg	ctg	ccc	ttc	gag	2016	
Glu	Val	Ala	Gly	Gln	Gly	Ala	Met	Ala	Leu	Val	Thr	Leu	Pro	Phe	Glu		
			660					665									
gag	gtc	gcg	gcc	agg	ctg	gcc	ggc	cgc	gtc	gac	gtg	gtc	gcc	gcg	atc	2064	
Glu	Val	Ala	Ala	Arg	Leu	Ala	Gly	Arg	Val	Asp	Val	Val	Ala	Ala	Ile		
			675					680									
gcc	tcc	tcc	ccc	tcg	tcg	acc	gtg	gtc	tcc	ggc	gac	ccg	gcc	gcg	ctg	2112	
Ala	Ser	Ser	Pro	Ser	Ser	Thr	Val	Val	Ser	Gly	Asp	Pro	Ala	Ala	Leu		
			690					695									
gac	gcg	ctg	gtc	gcc	gag	tgg	acc	gag	gag	ggc	ctg	ggc	gta	cgc	cgg	2160	
Asp	Ala	Leu	Val	Ala	Glu	Trp	Thr	Glu	Glu	Gly	Leu	Gly	Val	Arg	Arg		
			705					710									
gtc	gcc	tcc	gac	gtg	gcc	ttc	cac	agc	ccg	cac	atg	gat	ccg	ctg	ctc	2208	
Val	Ala	Ser	Asp	Val	Ala	Phe	His	Ser	Pro	His	Met	Asp	Pro	Leu	Leu		
			725					730									
gac	cgg	ctg	cgc	gcc	gcc	gtc	gac	ttc	acc	gcc	cgc	gca	ccc	cgg	gtg	2256	
Asp	Arg	Leu	Arg	Ala	Ala	Val	Asp	Phe	Thr	Ala	Arg	Ala	Pro	Arg	Val		
			740					745									
ccg	atc	tac	agc	acg	gcg	ctg	gcc	gac	ccg	cgg	gcc	ccg	atc	acc	gcc	2304	
Pro	Ile	Tyr	Ser	Thr	Ala	Leu	Ala	Asp	Pro	Arg	Ala	Pro	Ile	Thr	Ala		
			755					760									
gac	ggc	gag	tac	tgg	gcc	gcg	aac	ctg	cgc	aac	ccg	gtc	cgg	ctc	gcc	2352	
Asp	Gly	Glu	Tyr	Trp	Ala	Ala	Asn	Leu	Arg	Asn	Pro	Val	Arg	Leu	Ala		
			770					775									
gca	gcg	gtg	gcc	gcc	gcc	gtc	tcc	gac	gga	cac	cgg	gcc	ttc	atc	gag	2400	
Ala	Ala	Val	Ala	Ala	Ala	Val	Ser	Asp	Gly	His	Arg	Ala	Phe	Ile	Glu		
			785					790									
gtc	tcc	ccg	cac	ccg	gtg	gtg	acc	cac	tcg	atc	cac	gag	acg	ctg	gcc	2448	
Val	Ser	Pro	His	Pro	Val	Val	Thr	His	Ser	Ile	His	Glu	Thr	Leu	Ala		
			805					810									
gga	agc	ctc	gac	gac	gag	gtc	ttc	gtc	ggc	ggc	acc	ctg	cgc	cgc	gac	2496	
Gly	Ser	Leu	Asp	Asp	Glu	Val	Phe	Val	Gly	Gly	Thr	Leu	Arg	Arg	Asp		
			820					825									
acc	ccg	gag	gcg	cag	gcc	ttc	ctg	tcc	agc	ctg	ggg	gcc	gcg	cac	tgc	2544	
Thr	Pro	Glu	Ala	Gln	Ala	Phe	Leu	Ser	Ser	Leu	Gly	Ala	Ala	His	Cys		
			835					840									
cac	ggg	gtc	gcg	gtc	gac	tgg	ggc	cgg	gtg	cat	ccg	tcc	ggg	ccg	ctg	2592	
His	Gly	Val	Ala	Val	Asp	Trp	Gly	Arg	Val	His	Pro	Ser	Gly	Pro	Leu		
			850					855									
gtc	acc	ctg	ccc	ggc	tac	ccc	tgg	cgg	cac	cgg	agt	cac	tgg	cac	tgg	2640	
Val	Thr	Leu	Pro	Gly	Tyr	Pro	Trp	Arg	His	Arg	Ser	His	Trp	His	Trp		
			865					870									
ccg	acg	ccg	gcc	gcc	gcc	acg	ggc	cgg	ggc	cac	gac	ccc	gcg	tcg	cac	2688	
Pro	Thr	Pro	Ala	Ala	Ala	Thr	Gly	Arg	Gly	His	Asp	Pro	Ala	Ser	His		
			885					890									
acc	ctg	ctc	ggc	gcg	gtc	gac	aac	gtg	gcg	ggc	agc	gac	gtg	cgg	gtg	2736	
Thr	Leu	Leu	Gly	Ala	Val	Asp	Asn	Val	Ala	Gly	Ser	Asp	Val	Arg	Val		
			900					905									

tgg cgc acc gca ctc gac gac gcc agc cgc ccg tac ccg ggc agc cac	2784
Trp Arg Thr Ala Leu Asp Asp Ala Ser Arg Pro Tyr Pro Gly Ser His	
915 920 925	
gcc ctc aac ggc gtg gag atc gtt ccg gcg gcc gtg ctg gtg gag acc	2832
Ala Leu Asn Gly Val Glu Ile Val Pro Ala Ala Val Leu Val Glu Thr	
930 935 940	
ctc atg gct gcc gcc ggg cgg ggc gac ggc cgg ccg ctg ctg acc ggc	2880
Leu Met Ala Ala Ala Gly Arg Gly Asp Gly Arg Pro Leu Leu Thr Gly	
945 950 955 960	
ttg tcg atg cgg tac ccg ctg atg acc gcc ggg ctg cac gag gtc cag	2928
Leu Ser Met Arg Tyr Pro Leu Met Thr Ala Gly Leu His Glu Val Gln	
965 970 975	
gtg gtg cgg gac ggt gcc gag gtg ccg ctg gcg tcc cgt tcc gtc gac	2976
Val Val Arg Asp Gly Ala Glu Val Arg Leu Ala Ser Arg Ser Val Asp	
980 985 990	
gcg gag gcc gac ccg agc cgg gac tgg ctg atc cac acc gac gcc acg	3024
Ala Glu Ala Asp Pro Ser Arg Asp Trp Leu Ile His Thr Asp Ala Thr	
995 1000 1005	
gtg gcc gac gcc gac gcc acg gtg ctc gcc gcg cgg gcg ttg gcc gac	3072
Val Ala Asp Ala Asp Ala Thr Val Leu Ala Ala Arg Ala Leu Ala Asp	
1010 1015 1020	
ccc gac gac cac cgg atg gaa ccg ggc gac ccg ggc tcc atc cac cgc	3120
Pro Asp Asp His Arg Met Glu Pro Gly Asp Pro Gly Ser Ile His Arg	
1025 1030 1035 1040	
cgg ctc gcc gag gtc ggg gtg ccg tcg acg gga ttc gac tgg tcg gtg	3168
Arg Leu Ala Glu Val Gly Val Pro Ser Thr Gly Phe Asp Trp Ser Val	
1045 1050 1055	
gag gag ctg ctc tcc ggg tac ggc gtg ctc cgc gcg cgg gtg cgc tcg	3216
Glu Glu Leu Leu Ser Gly Tyr Gly Val Leu Arg Ala Arg Val Arg Ser	
1060 1065 1070	
gcc gac tcg tcc acc tgg gcg ccg gtg ctg gac gcc gtc atg tcg gtc	3264
Ala Asp Ser Ser Thr Trp Ala Pro Val Leu Asp Ala Val Met Ser Val	
1075 1080 1085	
gcc ccc gcc gtc ttc ccc ggc gtg ccg cag cta cgc atg gtg gtg tac	3312
Ala Pro Ala Val Phe Pro Gly Val Pro Gln Leu Arg Met Val Val Tyr	
1090 1095 1100	
gtc gac gag gtg ctg ctc acc ggc gag cca ccg gag gtg acg ctg atc	3360
Val Asp Glu Val Leu Leu Thr Gly Glu Pro Pro Glu Val Thr Leu Ile	
1105 1110 1115 1120	
gag gtc gcc ctc gac cca gac cgg ccc gac acg gcg aac gcg ctg gtc	3408
Glu Val Ala Leu Asp Pro Asp Arg Pro Asp Thr Ala Asn Ala Leu Val	
1125 1130 1135	
gcg gat gct cag ggc cgg gtc gtg gcc agc ctt ccc ggg ctg cgc tac	3456
Ala Asp Ala Gln Gly Arg Val Val Ala Ser Leu Pro Gly Leu Arg Tyr	
1140 1145 1150	
ccg gtg atc gac cag ccg gtc gcc ccg gcg cag gac agt tcc ggc gag	3504
Pro Val Ile Asp Gln Pro Val Ala Pro Ala Gln Asp Ser Ser Gly Glu	
1155 1160 1165	

gtg gag gag gcg gtc tcc ttc gcc ggc ctg tcc gac gag gaa ctg cac 3552
 Val Glu Glu Ala Val Ser Phe Ala Gly Leu Ser Asp Glu Glu Leu His
 1170 1175 1180

gag cgg gtg ttc gac gag gtg cgc cgg cag atc gcc ggg gag atg cga 3600
 Glu Arg Val Phe Asp Glu Val Arg Arg Gln Ile Ala Gly Glu Met Arg
 1185 1190 1195 1200

ctc gac gcc gac gac ctg cat ccc cgc cgg ccg ctg gcc gag cag ggc 3648
 Leu Asp Ala Asp Asp Leu His Pro Arg Arg Pro Leu Ala Glu Gln Gly
 1205 1210 1215

ctc gac tcg gtg atg acg gtg gtg atc cgg cga cgc ctg gag aag cgc 3696
 Leu Asp Ser Val Met Thr Val Val Ile Arg Arg Arg Leu Glu Lys Arg
 1220 1225 1230

acc ggg cgg agc ctc tcc ccg acc gtc ttc tgg cag cgg ccc acc gtc 3744
 Thr Gly Arg Ser Leu Ser Pro Thr Val Phe Trp Gln Arg Pro Thr Val
 1235 1240 1245

gcc gcc atc gcc gac cac ctg gtg gag ctg ttg agc acc ccg cag gag 3792
 Ala Ala Ile Ala Asp His Leu Val Glu Leu Leu Ser Thr Pro Gln Glu
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<213> Micromonospora carbonacea

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Ala Val Val Gly Ile Gly Cys Arg Phe Pro Gly Asp Val Asn Ser Pro
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Asp Glu Phe Trp Asp Leu Leu Thr Gly Gly Arg Asn Thr Thr Gly Thr
 35 40 45

Val Pro Glu Glu Arg Trp Ser Ala Tyr Arg Asp Leu Gly Pro Ala Phe
 50 55 60

Glu Ser Ala Leu Arg Ser Ala Thr Arg Ala Gly Asn Phe Leu Ala Asp
 65 70 75 80

Ile Ser Gly Phe Asp Ala Asp Phe Phe Gly Ile Ser Pro Arg Glu Ala
 85 90 95

Glu Leu Met Asp Pro Gln Gln Arg Leu Met Leu Glu Val Thr Trp Gln
 100 105 110

Ala Leu Glu Asp Ala Gly Ile Pro Pro Arg Thr Leu Ala Gly Thr Asp
 115 120 125

Val Gly Val Phe Ala Gly Val Cys Thr Tyr Asp Tyr Gly Gly His Gln
 130 135 140

Leu Glu Asp Leu Pro His Ile Asp Ala Trp Thr Gly Ile Gly Ala Ala
 145 150 155 160

Thr Cys Ala Val Ala Asn Arg Val Ser His Val Leu Asp Leu Arg Gly

				165					170					175				
Pro	Ser	Leu	Ser	Ile	Asp	Thr	Ala	Cys	Ser	Ala	Ser	Leu	Val	Ala	Leu			
			180					185					190					
His	Leu	Ala	Ala	Gln	Ser	Leu	Arg	Leu	Gly	Glu	Ser	Thr	Leu	Ala	Leu			
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Ala	Gly	Gly	Val	Asn	Leu	Ile	Val	Thr	Pro	Gly	Gln	Ser	Ile	Thr	Leu			
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Gly	Ser	Ala	Gly	Ala	Leu	Ala	Pro	Asp	Gly	Arg	Ser	Lys	Ser	Phe	Asp			
225					230					235					240			
Ala	Thr	Ala	Asp	Gly	Tyr	Gly	Arg	Gly	Glu	Gly	Cys	Gly	Val	Leu	Val			
				245					250					255				
Leu	Lys	Leu	Leu	Ser	Asp	Ala	Gln	Arg	Asp	Gly	Asp	Arg	Val	Leu	Ala			
			260					265					270					
Val	Leu	Arg	Gly	Ser	Ala	Val	Asn	Gln	Asp	Gly	Arg	Thr	Asn	Gly	Ile			
		275					280					285						
Met	Ala	Pro	Cys	Gly	Gln	Ala	Gln	Glu	His	Val	Met	Val	Arg	Ala	Leu			
	290					295					300							
Arg	Ser	Ala	Gly	Ile	Glu	Ala	Gly	Ser	Val	Asp	Tyr	Ile	Glu	Ala	His			
305					310					315					320			
Gly	Thr	Gly	Thr	Pro	Leu	Gly	Asp	Pro	Met	Glu	Ala	Ala	Ala	Ile	Gly			
				325					330					335				
Ser	Val	Tyr	Gly	Gln	Asp	Arg	Pro	Asp	Asp	Glu	Pro	Cys	Leu	Ile	Gly			
			340					345					350					
Ser	Val	Lys	Ser	Asn	Ile	Gly	His	Leu	Glu	Gly	Ala	Ala	Gly	Val	Ala			
		355					360					365						
Gly	Val	Ile	Lys	Ala	Val	Leu	Ala	Leu	Asn	Arg	Ala	Glu	Val	Pro	Ala			
	370					375					380							
Thr	Leu	Leu	Val	Thr	Glu	Val	Asn	Pro	Asp	Ile	Glu	Trp	Lys	Arg	Leu			
385					390					395					400			
Arg	Leu	Arg	Leu	Val	Thr	Arg	Asn	Gln	Pro	Trp	Pro	Asp	Arg	Pro	Gly			
				405					410					415				
Pro	Arg	Arg	Ala	Gly	Val	Ser	Gly	Phe	Gly	Tyr	Gly	Gly	Thr	Val	Ala			
			420					425					430					
His	Val	Val	Leu	Glu	Gln	Ala	Pro	Pro	Val	Ala	Ala	Glu	Pro	Ala	Pro			
		435					440					445						
Ala	Leu	Thr	Gly	Glu	Thr	Leu	Phe	Pro	Ile	Ser	Ala	Gly	Ser	Ala	His			
	450					455					460							
Ser	Leu	Arg	Glu	Arg	Ala	Arg	Ala	Leu	Ala	Gly	Ile	Val	Pro	Asp	Val			
465					470					475				480				
Asp	Leu	Ala	Ala	Leu	Gly	His	Thr	Leu	Ala	Arg	Arg	Arg	Ser	His	Leu			
				485					490					495				
Thr	His	Arg	Ala	Val	Ala	Val	Ala	Ala	Gly	Arg	Asp	Asp	Leu	Val	Ala			
			500					505					510					

Ala	Phe	Ala	Ala	Leu	Ala	Asp	Asp	Arg	Pro	His	Asp	Arg	Val	Arg	Thr	515	520	525
Gly	Ser	Pro	Val	Ala	Glu	Pro	Pro	Arg	Thr	Val	Trp	Val	Phe	Ser	Gly	530	535	540
His	Gly	Ser	Gln	Trp	Thr	Gly	Met	Gly	Arg	Glu	Leu	Leu	Ala	Thr	Glu	545	550	555
Pro	Ala	Phe	Ala	Asp	Ala	Ile	Asp	Arg	Ile	Glu	Gln	Ile	Phe	Leu	Asp	565	570	575
Glu	Ile	Gly	Phe	Ser	Pro	Arg	Gln	Ala	Ile	Leu	Asp	Gly	Asp	Tyr	Glu	580	585	590
Ala	Val	Asp	Arg	Thr	Gln	Thr	Met	Ile	Phe	Ala	Met	Gln	Leu	Gly	Leu	595	600	605
Ala	Glu	Met	Trp	Arg	Ala	Arg	Gly	Val	Glu	Pro	Asp	Ala	Val	Ile	Gly	610	615	620
His	Ser	Val	Gly	Glu	Ile	Ala	Ala	Ala	Val	Thr	Ala	Gly	Ile	Leu	Thr	625	630	635
Val	Ala	Asp	Gly	Ala	Arg	Leu	Ile	Cys	Arg	Arg	Ser	Leu	Leu	Leu	Arg	645	650	655
Glu	Val	Ala	Gly	Gln	Gly	Ala	Met	Ala	Leu	Val	Thr	Leu	Pro	Phe	Glu	660	665	670
Glu	Val	Ala	Ala	Arg	Leu	Ala	Gly	Arg	Val	Asp	Val	Val	Ala	Ala	Ile	675	680	685
Ala	Ser	Ser	Pro	Ser	Ser	Thr	Val	Val	Ser	Gly	Asp	Pro	Ala	Ala	Leu	690	695	700
Asp	Ala	Leu	Val	Ala	Glu	Trp	Thr	Glu	Glu	Gly	Leu	Gly	Val	Arg	Arg	705	710	715
Val	Ala	Ser	Asp	Val	Ala	Phe	His	Ser	Pro	His	Met	Asp	Pro	Leu	Leu	725	730	735
Asp	Arg	Leu	Arg	Ala	Ala	Val	Asp	Phe	Thr	Ala	Arg	Ala	Pro	Arg	Val	740	745	750
Pro	Ile	Tyr	Ser	Thr	Ala	Leu	Ala	Asp	Pro	Arg	Ala	Pro	Ile	Thr	Ala	755	760	765
Asp	Gly	Glu	Tyr	Trp	Ala	Ala	Asn	Leu	Arg	Asn	Pro	Val	Arg	Leu	Ala	770	775	780
Ala	Ala	Val	Ala	Ala	Ala	Val	Ser	Asp	Gly	His	Arg	Ala	Phe	Ile	Glu	785	790	795
Val	Ser	Pro	His	Pro	Val	Val	Thr	His	Ser	Ile	His	Glu	Thr	Leu	Ala	805	810	815
Gly	Ser	Leu	Asp	Asp	Glu	Val	Phe	Val	Gly	Gly	Thr	Leu	Arg	Arg	Asp	820	825	830
Thr	Pro	Glu	Ala	Gln	Ala	Phe	Leu	Ser	Ser	Leu	Gly	Ala	Ala	His	Cys	835	840	845
His	Gly	Val	Ala	Val	Asp	Trp	Gly	Arg	Val	His	Pro	Ser	Gly	Pro	Leu	850	855	860

Val Thr Leu Pro Gly Tyr Pro Trp Arg His Arg Ser His Trp His Trp
 865 870 875 880
 Pro Thr Pro Ala Ala Ala Thr Gly Arg Gly His Asp Pro Ala Ser His
 885 890 895
 Thr Leu Leu Gly Ala Val Asp Asn Val Ala Gly Ser Asp Val Arg Val
 900 905 910
 Trp Arg Thr Ala Leu Asp Asp Ala Ser Arg Pro Tyr Pro Gly Ser His
 915 920 925
 Ala Leu Asn Gly Val Glu Ile Val Pro Ala Ala Val Leu Val Glu Thr
 930 935 940
 Leu Met Ala Ala Ala Gly Arg Gly Asp Gly Arg Pro Leu Leu Thr Gly
 945 950 955 960
 Leu Ser Met Arg Tyr Pro Leu Met Thr Ala Gly Leu His Glu Val Gln
 965 970 975
 Val Val Arg Asp Gly Ala Glu Val Arg Leu Ala Ser Arg Ser Val Asp
 980 985 990
 Ala Glu Ala Asp Pro Ser Arg Asp Trp Leu Ile His Thr Asp Ala Thr
 995 1000 1005
 Val Ala Asp Ala Asp Ala Thr Val Leu Ala Ala Arg Ala Leu Ala Asp
 1010 1015 1020
 Pro Asp Asp His Arg Met Glu Pro Gly Asp Pro Gly Ser Ile His Arg
 1025 1030 1035 1040
 Arg Leu Ala Glu Val Gly Val Pro Ser Thr Gly Phe Asp Trp Ser Val
 1045 1050 1055
 Glu Glu Leu Leu Ser Gly Tyr Gly Val Leu Arg Ala Arg Val Arg Ser
 1060 1065 1070
 Ala Asp Ser Ser Thr Trp Ala Pro Val Leu Asp Ala Val Met Ser Val
 1075 1080 1085
 Ala Pro Ala Val Phe Pro Gly Val Pro Gln Leu Arg Met Val Val Tyr
 1090 1095 1100
 Val Asp Glu Val Leu Leu Thr Gly Glu Pro Pro Glu Val Thr Leu Ile
 1105 1110 1115 1120
 Glu Val Ala Leu Asp Pro Asp Arg Pro Asp Thr Ala Asn Ala Leu Val
 1125 1130 1135
 Ala Asp Ala Gln Gly Arg Val Val Ala Ser Leu Pro Gly Leu Arg Tyr
 1140 1145 1150
 Pro Val Ile Asp Gln Pro Val Ala Pro Ala Gln Asp Ser Ser Gly Glu
 1155 1160 1165
 Val Glu Glu Ala Val Ser Phe Ala Gly Leu Ser Asp Glu Glu Leu His
 1170 1175 1180
 Glu Arg Val Phe Asp Glu Val Arg Arg Gln Ile Ala Gly Glu Met Arg
 1185 1190 1195 1200
 Leu Asp Ala Asp Asp Leu His Pro Arg Arg Pro Leu Ala Glu Gln Gly

1205					1210					1215						
Leu	Asp	Ser	Val	Met	Thr	Val	Val	Ile	Arg	Arg	Arg	Arg	Leu	Glu	Lys	Arg
			1220					1225					1230			
Thr	Gly	Arg	Ser	Leu	Ser	Pro	Thr	Val	Phe	Trp	Gln	Arg	Pro	Thr	Val	
			1235					1240					1245			
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Val	Pro	Pro	Leu	Gly	Ser	His	Gln	Leu	Leu	Leu	Phe	Leu	Leu	Gln	Val	
1				5					10					15		
ggc	ctg	ctg	ctg	ctg	ctc	gcc	gtc	gtc	ctg	gga	cgg	gtg	gcg	caa	cgc	96
Gly	Leu	Leu	Leu	Leu	Leu	Ala	Val	Val	Leu	Gly	Arg	Val	Ala	Gln	Arg	
			20					25					30			
ttc	ggc	ctg	ccg	gcg	gtg	gtc	ggg	gag	ctg	ctg	acc	ggg	gtg	ctg	ctc	144
Phe	Gly	Leu	Pro	Ala	Val	Val	Gly	Glu	Leu	Leu	Thr	Gly	Val	Leu	Leu	
			35				40					45				
ggc	ccc	tgc	gtg	ctg	ggg	gcc	ctg	gca	ccc	gac	atc	gga	cgg	tgg	ctg	192
Gly	Pro	Ser	Val	Leu	Gly	Ala	Leu	Ala	Pro	Asp	Ile	Gly	Arg	Trp	Leu	
			50			55					60					
ctg	ccc	gcc	gac	ccc	gac	cag	gtc	cac	ctg	ctc	gac	gcc	atc	ggg	cag	240
Leu	Pro	Ala	Asp	Pro	Asp	Gln	Val	His	Leu	Leu	Asp	Ala	Ile	Gly	Gln	
			65		70						75				80	
ttc	ggc	gtc	gta	ctg	ctg	gtc	gcc	gtg	gcc	ggg	ctg	cac	ctg	gac	ctg	288
Phe	Gly	Val	Val	Leu	Leu	Val	Ala	Val	Ala	Gly	Leu	His	Leu	Asp	Leu	
				85					90					95		
cgg	ctg	gtc	cgg	cgg	cgg	gcc	ggc	acg	atc	ggc	gcg	gtg	gcc	gtc	ggc	336
Arg	Leu	Val	Arg	Arg	Arg	Ala	Gly	Thr	Ile	Gly	Ala	Val	Ala	Val	Gly	
			100					105					110			
ggc	ctc	gcg	gtg	ccc	ctc	ggc	ctg	ggc	atc	gcc	gcc	ggc	ctg	ctg	gcc	384
Gly	Leu	Ala	Val	Pro	Leu	Gly	Leu	Gly	Ile	Ala	Ala	Gly	Leu	Leu	Ala	
			115				120					125				
ccg	gcg	gcg	ctt	ctc	gcg	gcc	ggg	cag	gag	cgg	act	gtc	ttc	gcg	ctg	432
Pro	Ala	Ala	Leu	Leu	Ala	Ala	Gly	Gln	Glu	Arg	Thr	Val	Phe	Ala	Leu	
			130			135					140					
ttc	gtc	ggc	gtg	gcg	atg	gcg	gtc	agc	gcc	gtg	ccg	gtg	atc	gcg	aag	480
Phe	Val	Gly	Val	Ala	Met	Ala	Val	Ser	Ala	Val	Pro	Val	Ile	Ala	Lys	
					150					155					160	

acg	ctc	acc	gac	atg	cgc	ctg	ctg	cac	cgc	gac	gtg	ggg	cag	atc	atc	528
Thr	Leu	Thr	Asp	Met	Arg	Leu	Leu	His	Arg	Asp	Val	Gly	Gln	Ile	Ile	
				165					170					175		
ctg	gct	gcg	gcg	tcg	ctg	gag	gac	gct	gcg	gcc	tgg	ttc	ctg	ctg	tcg	576
Leu	Ala	Ala	Ala	Ser	Leu	Glu	Asp	Ala	Ala	Ala	Trp	Phe	Leu	Leu	Ser	
				180				185					190			
ctc	atc	tcg	tcg	gtg	gcg	gtg	agc	acc	ctc	acc	gcc	ggg	cag	gtg	gtg	624
Leu	Ile	Ser	Ser	Val	Ala	Val	Ser	Thr	Leu	Thr	Ala	Gly	Gln	Val	Val	
		195					200					205				
acc	gcc	ctg	ctt	tac	ctc	gtg	gcc	tac	ctc	gcg	gtg	gcc	gtc	ctg	gtc	672
Thr	Ala	Leu	Leu	Tyr	Leu	Val	Ala	Tyr	Leu	Ala	Val	Ala	Val	Leu	Val	
	210					215					220					
ggc	cgg	ccg	gtg	acc	cgg	cgc	gcc	atg	cgc	tgg	gcg	aac	gcc	cag	ccc	720
Gly	Arg	Pro	Val	Thr	Arg	Arg	Ala	Met	Arg	Trp	Ala	Asn	Ala	Gln	Pro	
225					230					235					240	
gac	ggc	ggg	gcc	gcc	agc	gcc	gtc	gcc	gtg	gtg	atc	gtg	ctg	gcc	ttc	768
Asp	Gly	Gly	Ala	Ala	Ser	Ala	Val	Ala	Val	Val	Ile	Val	Leu	Ala	Phe	
				245				250						255		
gcg	gcg	ggg	gcg	cac	gcg	ctg	ggc	ctg	gag	gcg	atc	ttc	ggc	gcg	ctg	816
Ala	Ala	Gly	Ala	His	Ala	Leu	Gly	Leu	Glu	Ala	Ile	Phe	Gly	Ala	Leu	
			260				265						270			
gtg	gcg	ggt	gtc	ctg	atc	ggc	ctt	ccc	ggc	aac	ggg	gag	ccg	gcc	cgg	864
Val	Ala	Gly	Val	Leu	Ile	Gly	Leu	Pro	Gly	Asn	Gly	Glu	Pro	Ala	Arg	
		275					280					285				
ctg	gca	ccg	ctg	cgc	acg	gtg	gtg	ctg	tcc	gtg	ctc	gcc	ccg	atc	ttc	912
Leu	Ala	Pro	Leu	Arg	Thr	Val	Val	Leu	Ser	Val	Leu	Ala	Pro	Ile	Phe	
	290					295					300					
ctg	gcc	agc	gcg	ggg	ctc	cgg	gtc	gat	ctg	cgt	gcc	ctc	gcc	gac	ccg	960
Leu	Ala	Ser	Ala	Gly	Leu	Arg	Val	Asp	Leu	Arg	Ala	Leu	Ala	Asp	Pro	
305					310					315					320	
gag	gtg	ctc	gcc	gcc	ggg	gcg	gtg	atc	ctg	gcg	ctc	gcc	gtg	ctc	ggc	1008
Glu	Val	Leu	Ala	Ala	Gly	Ala	Val	Ile	Leu	Ala	Leu	Ala	Val	Leu	Gly	
				325					330					335		
aag	tac	acc	ggc	gcg	tac	ctg	ggt	gca	cgg	ctg	gcc	cgg	cag	agc	cac	1056
Lys	Tyr	Thr	Gly	Ala	Tyr	Leu	Gly	Ala	Arg	Leu	Ala	Arg	Gln	Ser	His	
			340					345					350			
tgg	gag	ggc	gtc	gcc	ctc	ggc	gcc	ggg	ctc	aac	gcg	cgc	ggt	gcc	gtg	1104
Trp	Glu	Gly	Val	Ala	Leu	Gly	Ala	Gly	Leu	Asn	Ala	Arg	Gly	Ala	Val	
		355					360					365				
gag	atc	atc	atc	gcg	atg	gtc	ggg	ctg	cgc	ctg	ggc	gtg	ctg	aac	acc	1152
Glu	Ile	Ile	Ile	Ala	Met	Val	Gly	Leu	Arg	Leu	Gly	Val	Leu	Asn	Thr	
	370					375					380					
gcc	tca	tac	acc	atc	gtg	gtg	ctg	gtc	gcg	gtc	gtc	acc	tcg	gtc	atg	1200
Ala	Ser	Tyr	Thr	Ile	Val	Val	Leu	Val	Ala	Val	Val	Thr	Ser	Val	Met	
	385				390					395					400	
gcg	ccg	ccg	atg	ctg	cgc	gtc	gcc	atg	cgg	cgg	gtc	gaa	cag	aac	gcc	1248
Ala	Pro	Pro	Met	Leu	Arg	Val	Ala	Met	Arg	Arg	Val	Glu	Gln	Asn	Ala	
				405					410					415		

gag gag acc ctg cgg gag agc cgc cac ctg gag tgg gcc gcc acc cct 1296
 Glu Glu Thr Leu Arg Glu Ser Arg His Leu Glu Trp Ala Ala Thr Pro
 420 425 430

gcg gtg gac cag cgg ccg ggc 1317
 Ala Val Asp Gln Arg Pro Gly
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 Gly Leu Leu Leu Leu Leu Ala Val Val Leu Gly Arg Val Ala Gln Arg
 20 25 30
 Phe Gly Leu Pro Ala Val Val Gly Glu Leu Leu Thr Gly Val Leu Leu
 35 40 45
 Gly Pro Ser Val Leu Gly Ala Leu Ala Pro Asp Ile Gly Arg Trp Leu
 50 55 60
 Leu Pro Ala Asp Pro Asp Gln Val His Leu Leu Asp Ala Ile Gly Gln
 65 70 75 80
 Phe Gly Val Val Leu Leu Val Ala Val Ala Gly Leu His Leu Asp Leu
 85 90 95
 Arg Leu Val Arg Arg Arg Ala Gly Thr Ile Gly Ala Val Ala Val Gly
 100 105 110
 Gly Leu Ala Val Pro Leu Gly Leu Gly Ile Ala Ala Gly Leu Leu Ala
 115 120 125
 Pro Ala Ala Leu Leu Ala Ala Gly Gln Glu Arg Thr Val Phe Ala Leu
 130 135 140
 Phe Val Gly Val Ala Met Ala Val Ser Ala Val Pro Val Ile Ala Lys
 145 150 155 160
 Thr Leu Thr Asp Met Arg Leu Leu His Arg Asp Val Gly Gln Ile Ile
 165 170 175
 Leu Ala Ala Ala Ser Leu Glu Asp Ala Ala Ala Trp Phe Leu Leu Ser
 180 185 190
 Leu Ile Ser Ser Val Ala Val Ser Thr Leu Thr Ala Gly Gln Val Val
 195 200 205
 Thr Ala Leu Leu Tyr Leu Val Ala Tyr Leu Ala Val Ala Val Leu Val
 210 215 220
 Gly Arg Pro Val Thr Arg Arg Ala Met Arg Trp Ala Asn Ala Gln Pro
 225 230 235 240
 Asp Gly Gly Ala Ala Ser Ala Val Ala Val Val Ile Val Leu Ala Phe
 245 250 255

Ala Ala Gly Ala His Ala Leu Gly Leu Glu Ala Ile Phe Gly Ala Leu
260 265 270

Val Ala Gly Val Leu Ile Gly Leu Pro Gly Asn Gly Glu Pro Ala Arg
275 280 285

Leu Ala Pro Leu Arg Thr Val Val Leu Ser Val Leu Ala Pro Ile Phe
290 295 300

Leu Ala Ser Ala Gly Leu Arg Val Asp Leu Arg Ala Leu Ala Asp Pro
305 310 315 320

Glu Val Leu Ala Ala Gly Ala Val Ile Leu Ala Leu Ala Val Leu Gly
325 330 335

Lys Tyr Thr Gly Ala Tyr Leu Gly Ala Arg Leu Ala Arg Gln Ser His
340 345 350

Trp Glu Gly Val Ala Leu Gly Ala Gly Leu Asn Ala Arg Gly Ala Val
355 360 365

Glu Ile Ile Ile Ala Met Val Gly Leu Arg Leu Gly Val Leu Asn Thr
370 375 380

Ala Ser Tyr Thr Ile Val Val Leu Val Ala Val Val Thr Ser Val Met
385 390 395 400

Ala Pro Pro Met Leu Arg Val Ala Met Arg Arg Val Glu Gln Asn Ala
405 410 415

Glu Glu Thr Leu Arg Glu Ser Arg His Leu Glu Trp Ala Ala Thr Pro
420 425 430

Ala Val Asp Gln Arg Pro Gly
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Met Arg Arg Thr Arg Leu Ala Met Leu Ala Gly Glu Arg Val Asp Ala
1 5 10 15

tgc tcc tac tgc tac cac cgc gag gac cac ggc gcg ctg tcg tac cgg 96
Cys Ser Tyr Cys Tyr His Arg Glu Asp His Gly Ala Leu Ser Tyr Arg
20 25 30

cag gag atc aac cag cgg ttc cgg gac atc gcc gac ccc gac cgg ctg 144
Gln Glu Ile Asn Gln Arg Phe Arg Asp Ile Ala Asp Pro Asp Arg Leu
35 40 45

gcc gcc cgc acc gcg ccc gac ggc acc gtc gag gac ttc ccg ttc ttc 192
Ala Ala Arg Thr Ala Pro Asp Gly Thr Val Glu Asp Phe Pro Phe Phe

50	55	60	
ctc gac atc cgg ttc ggc aac acc tgc aac ctg cgg tgc gtg atg tgc Leu Asp Ile Arg Phe Gly Asn Thr Cys Asn Leu Arg Cys Val Met Cys 65 70 75 80			240
gcg tac ccg gtc agc tcg ggc tgg ggc gcc aag aag cgg ccg gcc tgg Ala Tyr Pro Val Ser Ser Gly Trp Gly Ala Lys Lys Arg Pro Ala Trp 85 90 95			288
tcg tcc gcg gtc atc gac gcc tac cgg gac gac gac gag ctg tgg cag Ser Ser Ala Val Ile Asp Ala Tyr Arg Asp Asp Asp Glu Leu Trp Gln 100 105 110			336
acc ctg cgc gag aac gcc cac ctc atc cgg cgg ctg tac ttc gcc ggt Thr Leu Arg Glu Asn Ala His Leu Ile Arg Arg Leu Tyr Phe Ala Gly 115 120 125			384
ggg gag ccg ttc atg cag ccg ggc cac ttc gcc ctg ctc gac ctg ctg Gly Glu Pro Phe Met Gln Pro Gly His Phe Ala Leu Leu Asp Leu Leu 130 135 140			432
gtg gag acg ggt aac gcc ggc aac gtc gac gtc gtc tac aac tcc aac Val Glu Thr Gly Asn Ala Gly Asn Val Asp Val Val Tyr Asn Ser Asn 145 150 155 160			480
ctc acc gtg ttg ccg gag tcg gtc ttc gac cgg ttc cgg cac ttc aag Leu Thr Val Leu Pro Glu Ser Val Phe Asp Arg Phe Arg His Phe Lys 165 170 175			528
agc atc ggc atc ggc gcc tcc tgc gac ggc tac ggc gag gtg ttc gag Ser Ile Gly Ile Gly Ala Ser Cys Asp Gly Tyr Gly Glu Val Phe Glu 180 185 190			576
cgg atc cgg cag ggc gcg aag tgg gag acc ttc atc gcg aac gtc cgc Arg Ile Arg Gln Gly Ala Lys Trp Glu Thr Phe Ile Ala Asn Val Arg 195 200 205			624
cgg gcc cgc tcg gag gtc aac ctc tgg ctc cag gtg gca ccc cag cgg Arg Ala Arg Ser Glu Val Asn Leu Trp Leu Gln Val Ala Pro Gln Arg 210 215 220			672
gac aac gtc tgg ggg ctg cgc gac ctg ctg gag ttc gcc cgg gcc gag Asp Asn Val Trp Gly Leu Arg Asp Leu Leu Glu Phe Ala Arg Ala Glu 225 230 235 240			720
ggg ctc gac gtg gac ctg gcc aac gtg gtg cag tgg ccg gcc gag atg Gly Leu Asp Val Asp Leu Ala Asn Val Val Gln Trp Pro Ala Glu Met 245 250 255			768
tcg gtg ctc agc ctg ccc gag gag gac aag gtt cgg gcc acc ggg gag Ser Val Leu Ser Leu Pro Glu Glu Asp Lys Val Arg Ala Thr Gly Glu 260 265 270			816
ctg acc tcc ctc atc gat tgg tgc gcc ggg ctg ggc tgg gag aag ccc Leu Thr Ser Leu Ile Asp Trp Cys Ala Gly Leu Gly Trp Glu Lys Pro 275 280 285			864
gcc gcc gac ctg cgg gcc ctg cgg acc ttc atg aac tcg gcc gac ccg Ala Ala Asp Leu Arg Ala Leu Arg Thr Phe Met Asn Ser Ala Asp Pro 290 295 300			912
gtg gac ctg ccg ccc gag atc gcg gcc Val Asp Leu Pro Pro Glu Ile Ala Ala 305 310			939

<210> 49
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 <212> PRT
 <213> Micromonospora carbonacea

<220>
 <223> evrL

<400> 49

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Met Arg Arg Thr Arg Leu Ala Met Leu Ala Gly Glu Arg Val Asp Ala
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Cys Ser Tyr Cys Tyr His Arg Glu Asp His Gly Ala Leu Ser Tyr Arg
          20           25           30

Gln Glu Ile Asn Gln Arg Phe Arg Asp Ile Ala Asp Pro Asp Arg Leu
          35           40           45

Ala Ala Arg Thr Ala Pro Asp Gly Thr Val Glu Asp Phe Pro Phe Phe
 50           55           60

Leu Asp Ile Arg Phe Gly Asn Thr Cys Asn Leu Arg Cys Val Met Cys
 65           70           75           80

Ala Tyr Pro Val Ser Ser Gly Trp Gly Ala Lys Lys Arg Pro Ala Trp
          85           90           95

Ser Ser Ala Val Ile Asp Ala Tyr Arg Asp Asp Asp Glu Leu Trp Gln
          100           105           110

Thr Leu Arg Glu Asn Ala His Leu Ile Arg Arg Leu Tyr Phe Ala Gly
          115           120           125

Gly Glu Pro Phe Met Gln Pro Gly His Phe Ala Leu Leu Asp Leu Leu
          130           135           140

Val Glu Thr Gly Asn Ala Gly Asn Val Asp Val Val Tyr Asn Ser Asn
          145           150           155           160

Leu Thr Val Leu Pro Glu Ser Val Phe Asp Arg Phe Arg His Phe Lys
          165           170           175

Ser Ile Gly Ile Gly Ala Ser Cys Asp Gly Tyr Gly Glu Val Phe Glu
          180           185           190

Arg Ile Arg Gln Gly Ala Lys Trp Glu Thr Phe Ile Ala Asn Val Arg
          195           200           205

Arg Ala Arg Ser Glu Val Asn Leu Trp Leu Gln Val Ala Pro Gln Arg
          210           215           220

Asp Asn Val Trp Gly Leu Arg Asp Leu Leu Glu Phe Ala Arg Ala Glu
          225           230           235           240

Gly Leu Asp Val Asp Leu Ala Asn Val Val Gln Trp Pro Ala Glu Met
          245           250           255

Ser Val Leu Ser Leu Pro Glu Glu Asp Lys Val Arg Ala Thr Gly Glu
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Leu Thr Ser Leu Ile Asp Trp Cys Ala Gly Leu Gly Trp Glu Lys Pro
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Ala Ala Asp Leu Arg Ala Leu Arg Thr Phe Met Asn Ser Ala Asp Pro
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Val Asp Leu Pro Pro Glu Ile Ala Ala
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<210> 50

<211> 1236

<212> DNA

<213> Micromonospora carbonacea

<220>

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 Val Leu Asp Leu Gly Ala Gln Tyr Leu Gln Gly Ser Phe Val Lys Pro
 20 25 30

ggc gtg tcg gac ccg ccc agg gtg cgc ttc ccc ctg gag ctg acc cgg 144
 Gly Val Ser Asp Pro Pro Arg Val Arg Phe Pro Leu Glu Leu Thr Arg
 35 40 45

tgc gcg gaa cgc gac ggc ggt gac ccg tgc ggc ctg gtg cag ttg cgg 192
 Cys Ala Glu Arg Asp Gly Gly Asp Pro Cys Gly Leu Val Gln Leu Arg
 50 55 60

cac acc ctg ccg ggt ggg ctg ctc tac gac acc tac tgg tac cgc tcg 240
 His Thr Leu Pro Gly Gly Leu Leu Tyr Asp Thr Tyr Trp Tyr Arg Ser
 65 70 75 80

cgg atc aac gac acg atg cgc cgg cat ctc gcc gac gtc gtg gac gcg 288
 Arg Ile Asn Asp Thr Met Arg Arg His Leu Ala Asp Val Val Asp Ala
 85 90 95

gcg gtc gag gtg ttg ggg gag cgg ccc ggc aag gtg ctc gac atc ggc 336
 Ala Val Glu Val Leu Gly Glu Arg Pro Gly Lys Val Leu Asp Ile Gly
 100 105 110

tgc aac gac ggc acc ctg ctg ggc aac ctg acc gac gcg cag cgg tgg 384
 Cys Asn Asp Gly Thr Leu Leu Gly Asn Leu Thr Asp Ala Gln Arg Trp
 115 120 125

ggc atc gac ccc tcc agc gcc gcc gac gac gcg ccc gac gac ttc aat 432
 Gly Ile Asp Pro Ser Ser Ala Ala Asp Asp Ala Pro Asp Asp Phe Asn
 130 135 140

ctg atc cgc gac ttc ttc ccc agc ccc gag ctg gtc ccg cac gcg ggc 480
 Leu Ile Arg Asp Phe Phe Pro Ser Pro Glu Leu Val Pro His Ala Gly
 145 150 155 160

agc ttc gac ctg gtc acc tcg atc gcg atg ttc tac gac gtc gag gac 528
 Ser Phe Asp Leu Val Thr Ser Ile Ala Met Phe Tyr Asp Val Glu Asp
 165 170 175

ccg	gtg	gag	ttc	gcc	cgt	cag	gtc	gag	gcg	ctg	ctc	gcc	ccg	ggc	ggg	576
Pro	Val	Glu	Phe	Ala	Arg	Gln	Val	Glu	Ala	Leu	Leu	Ala	Pro	Gly	Gly	
			180					185						190		
gtc	tgg	gtg	gtc	gag	gtc	gcc	tac	ctg	ccg	gcg	atg	ctg	gag	atc	gcc	624
Val	Trp	Val	Val	Glu	Val	Ala	Tyr	Leu	Pro	Ala	Met	Leu	Glu	Ile	Ala	
		195					200					205				
ggc	tac	gac	agc	atc	tgc	cac	gag	cac	ctg	tcc	tac	tac	tcg	ctg	gcc	672
Gly	Tyr	Asp	Ser	Ile	Cys	His	Glu	His	Leu	Ser	Tyr	Tyr	Ser	Leu	Ala	
	210					215					220					
acg	ctg	agc	cgc	att	ctg	ggc	gcg	gcg	ggc	ctg	gag	atc	gtc	cgt	gcc	720
Thr	Leu	Ser	Arg	Ile	Leu	Gly	Ala	Ala	Gly	Leu	Glu	Ile	Val	Arg	Ala	
225					230					235					240	
agc	ctc	aac	ggg	gtg	aac	ggc	ggc	tcg	atc	tgc	tgc	gtg	gtc	acc	cgg	768
Ser	Leu	Asn	Gly	Val	Asn	Gly	Gly	Ser	Ile	Cys	Cys	Val	Val	Thr	Arg	
				245					250					255		
gcc	ggt	gag	gtg	ggc	ggc	cgg	gcc	gac	ggt	tcg	gtc	aag	gca	ctc	gcc	816
Ala	Gly	Glu	Val	Gly	Gly	Arg	Ala	Asp	Gly	Ser	Val	Lys	Ala	Leu	Ala	
			260					265					270			
gac	cgg	gag	ctg	gcg	ctg	ggg	ctg	gac	ggc	gac	gcc	ccg	tac	cag	cgc	864
Asp	Arg	Glu	Leu	Ala	Leu	Gly	Leu	Asp	Gly	Asp	Ala	Pro	Tyr	Gln	Arg	
		275					280					285				
ttc	gcc	gag	cag	gtg	cgc	cag	cac	cgt	gac	gag	gtg	agc	gcc	ctg	ctg	912
Phe	Ala	Glu	Gln	Val	Arg	Gln	His	Arg	Asp	Glu	Val	Ser	Ala	Leu	Leu	
	290					295					300					
cgc	gag	ctg	cgg	ggc	cag	ggc	cgc	acg	gtg	cac	gtc	tac	ggc	gcg	tcg	960
Arg	Glu	Leu	Arg	Gly	Gln	Gly	Arg	Thr	Val	His	Val	Tyr	Gly	Ala	Ser	
305					310					315					320	
acg	aag	ggc	aac	acc	ctc	ctg	cag	ttc	tgc	ggc	ata	gac	cgc	gag	ctc	1008
Thr	Lys	Gly	Asn	Thr	Leu	Leu	Gln	Phe	Cys	Gly	Ile	Asp	Arg	Glu	Leu	
				325					330					335		
atc	cgg	tac	gcc	gcg	gag	cgc	aat	ccg	gac	aag	gtg	ggc	gcg	cgc	acc	1056
Ile	Arg	Tyr	Ala	Ala	Glu	Arg	Asn	Pro	Asp	Lys	Val	Gly	Ala	Arg	Thr	
			340					345					350			
ctc	ggc	acg	gac	atc	gaa	atc	atc	agc	gag	cag	gag	tcg	cgg	gcg	gcc	1104
Leu	Gly	Thr	Asp	Ile	Glu	Ile	Ile	Ser	Glu	Gln	Glu	Ser	Arg	Ala	Ala	
		355					360					365				
cgc	ccg	gac	tac	tac	ctg	gtc	ctg	ccc	tgg	cac	ttc	cgg	gac	gag	atc	1152
Arg	Pro	Asp	Tyr	Tyr	Leu	Val	Leu	Pro	Trp	His	Phe	Arg	Asp	Glu	Ile	
		370				375					380					
gtc	gcc	cgg	gag	gcg	gag	atg	ctg	gcc	agc	ggc	acc	cgg	ttg	atc	ttt	1200
Val	Ala	Arg	Glu	Ala	Glu	Met	Leu	Ala	Ser	Gly	Thr	Arg	Leu	Ile	Phe	
385					390					395					400	
ccg	ctg	ccc	cgg	gtc	gag	acg	gtc	ggc	cga	ccg	gga					1236
Pro	Leu	Pro	Arg	Val	Glu	Thr	Val	Gly	Arg	Pro	Gly					
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<211> 412

<212> PRT

<213> Micromonospora carbonacea

<220>

<223> evrM

<400> 51

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Gly	Val	Ser	Asp	Pro	Pro	Arg	Val	Arg	Phe	Pro	Leu	Glu	Leu	Thr	Arg	35	40	45	
Cys	Ala	Glu	Arg	Asp	Gly	Gly	Asp	Pro	Cys	Gly	Leu	Val	Gln	Leu	Arg	50	55	60	
His	Thr	Leu	Pro	Gly	Gly	Leu	Leu	Tyr	Asp	Thr	Tyr	Trp	Tyr	Arg	Ser	65	70	75	
Arg	Ile	Asn	Asp	Thr	Met	Arg	Arg	His	Leu	Ala	Asp	Val	Val	Asp	Ala	85	90	95	
Ala	Val	Glu	Val	Leu	Gly	Glu	Arg	Pro	Gly	Lys	Val	Leu	Asp	Ile	Gly	100	105	110	
Cys	Asn	Asp	Gly	Thr	Leu	Leu	Gly	Asn	Leu	Thr	Asp	Ala	Gln	Arg	Trp	115	120	125	
Gly	Ile	Asp	Pro	Ser	Ser	Ala	Ala	Asp	Asp	Ala	Pro	Asp	Asp	Phe	Asn	130	135	140	
Leu	Ile	Arg	Asp	Phe	Phe	Pro	Ser	Pro	Glu	Leu	Val	Pro	His	Ala	Gly	145	150	155	
Ser	Phe	Asp	Leu	Val	Thr	Ser	Ile	Ala	Met	Phe	Tyr	Asp	Val	Glu	Asp	165	170	175	
Pro	Val	Glu	Phe	Ala	Arg	Gln	Val	Glu	Ala	Leu	Leu	Ala	Pro	Gly	Gly	180	185	190	
Val	Trp	Val	Val	Glu	Val	Ala	Tyr	Leu	Pro	Ala	Met	Leu	Glu	Ile	Ala	195	200	205	
Gly	Tyr	Asp	Ser	Ile	Cys	His	Glu	His	Leu	Ser	Tyr	Tyr	Ser	Leu	Ala	210	215	220	
Thr	Leu	Ser	Arg	Ile	Leu	Gly	Ala	Ala	Gly	Leu	Glu	Ile	Val	Arg	Ala	225	230	235	
Ser	Leu	Asn	Gly	Val	Asn	Gly	Gly	Ser	Ile	Cys	Cys	Val	Val	Thr	Arg	245	250	255	
Ala	Gly	Glu	Val	Gly	Gly	Arg	Ala	Asp	Gly	Ser	Val	Lys	Ala	Leu	Ala	260	265	270	
Asp	Arg	Glu	Leu	Ala	Leu	Gly	Leu	Asp	Gly	Asp	Ala	Pro	Tyr	Gln	Arg	275	280	285	
Phe	Ala	Glu	Gln	Val	Arg	Gln	His	Arg	Asp	Glu	Val	Ser	Ala	Leu	Leu	290	295	300	
Arg	Glu	Leu	Arg	Gly	Gln	Gly	Arg	Thr	Val	His	Val	Tyr	Gly	Ala	Ser	305	310	315	

Thr	Lys	Gly	Asn	Thr	Leu	Leu	Gln	Phe	Cys	Gly	Ile	Asp	Arg	Glu	Leu
				325					330					335	
Ile	Arg	Tyr	Ala	Ala	Glu	Arg	Asn	Pro	Asp	Lys	Val	Gly	Ala	Arg	Thr
			340					345					350		
Leu	Gly	Thr	Asp	Ile	Glu	Ile	Ile	Ser	Glu	Gln	Glu	Ser	Arg	Ala	Ala
		355					360					365			
Arg	Pro	Asp	Tyr	Tyr	Leu	Val	Leu	Pro	Trp	His	Phe	Arg	Asp	Glu	Ile
	370					375					380				
Val	Ala	Arg	Glu	Ala	Glu	Met	Leu	Ala	Ser	Gly	Thr	Arg	Leu	Ile	Phe
385					390					395					400
Pro	Leu	Pro	Arg	Val	Glu	Thr	Val	Gly	Arg	Pro	Gly				
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<212> DNA
<213> Micromonospora carbonacea

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1				5				10				15				
gca	tac	gcc	cac	ttc	ctg	gac	ctg	cgc	gac	gcg	ctg	gcg	gag	gcg	gtc	96
Ala	Tyr	Ala	His	Phe	Leu	Asp	Leu	Arg	Asp	Ala	Leu	Ala	Glu	Ala	Val	
				20				25				30				
cgg	gac	gcc	acg	gga	gtc	tgg	ctc	gac	tac	ggc	gcg	ggc	acc	tcg	cca	144
Arg	Asp	Ala	Thr	Gly	Val	Trp	Leu	Asp	Tyr	Gly	Ala	Gly	Thr	Ser	Pro	
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tac	cgg	ggc	ctg	ttc	cgc	tcc	gcc	gag	ttg	cag	acc	ggc	gac	atc	ccg	192
Tyr	Arg	Gly	Leu	Phe	Arg	Ser	Ala	Glu	Leu	Gln	Thr	Ala	Asp	Ile	Pro	
50				55				60								
ggc	ggc	gag	tcc	ctg	ccg	gcc	gac	cac	gcc	ctc	gac	cgg	gac	ggg	cgc	240
Gly	Gly	Glu	Ser	Leu	Pro	Ala	Asp	His	Ala	Leu	Asp	Arg	Asp	Gly	Arg	
65				70				75				80				
tgc	ccg	gtg	ccg	gac	ggg	acg	ttc	gac	ggg	gtg	ctc	tcc	acc	cag	gtg	288
Cys	Pro	Val	Pro	Asp	Gly	Thr	Phe	Asp	Gly	Val	Leu	Ser	Thr	Gln	Val	
				85				90				95				
ctc	gaa	cac	gtc	tcg	gac	gcg	gac	gcg	tac	ctg	cgg	gag	gcg	tac	cgg	336
Leu	Glu	His	Val	Ser	Asp	Ala	Asp	Ala	Tyr	Leu	Arg	Glu	Ala	Tyr	Arg	
100				105				110								
ctg	ctg	cgc	ccg	ggc	ggc	cgg	ctg	gtg	ctc	tcc	acc	cac	ggg	gtg	tgg	384
Leu	Leu	Arg	Pro	Gly	Gly	Arg	Leu	Val	Leu	Ser	Thr	His	Gly	Val	Trp	
115				120				125								

gag gag cac ggc ggc cag gac ctg tgg cgg tgg acc gcc gac ggg ctg 432
 Glu Glu His Gly Gly Gln Asp Leu Trp Arg Trp Thr Ala Asp Gly Leu
 130 135 140
 gcc cgc cag gcc gag tgg gcc ggc ttc acc gtc gac cgc acc gtc aag 480
 Ala Arg Gln Ala Glu Trp Ala Gly Phe Thr Val Asp Arg Thr Val Lys
 145 150 155 160
 ctg acc tgc ggg ccg cgc ggc ctg ttg ctg ctg ctg cgc tgg tac ggc 528
 Leu Thr Cys Gly Pro Arg Gly Leu Leu Leu Leu Leu Arg Trp Tyr Gly
 165 170 175
 cgc gag cac ggc tgg ccg tcc ggc ggc ccg gtg ggt ctg gcc ctg cgc 576
 Arg Glu His Gly Trp Pro Ser Gly Gly Pro Val Gly Leu Ala Leu Arg
 180 185 190
 gcc ctg tgg ctg gtg gac cgg ctg cgg ccc cgc gcg ctc gac gag tac 624
 Ala Leu Trp Leu Val Asp Arg Leu Arg Pro Arg Ala Leu Asp Glu Tyr
 195 200 205
 ctc gac cgg gcg ttc cgg cat ctc ggc cgc agc gag ggc ccc gac cag 672
 Leu Asp Arg Ala Phe Arg His Leu Gly Arg Ser Glu Gly Pro Asp Gln
 210 215 220
 ccc ttc tat ctg gac atc ctg ctg gtc gcc agc aaa ccg cac gac ggg 720
 Pro Phe Tyr Leu Asp Ile Leu Leu Val Ala Ser Lys Pro His Asp Gly
 225 230 235 240
 gcg cct ggt ccc gca cac cgg cac gag acg agg agg acc 759
 Ala Pro Gly Pro Ala His Arg His Glu Thr Arg Arg Thr
 245 250

<210> 53
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 <213> Micromonospora carbonacea

<220>
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 Arg Asp Ala Thr Gly Val Trp Leu Asp Tyr Gly Ala Gly Thr Ser Pro
 35 40 45
 Tyr Arg Gly Leu Phe Arg Ser Ala Glu Leu Gln Thr Ala Asp Ile Pro
 50 55 60
 Gly Gly Glu Ser Leu Pro Ala Asp His Ala Leu Asp Arg Asp Gly Arg
 65 70 75 80
 Cys Pro Val Pro Asp Gly Thr Phe Asp Gly Val Leu Ser Thr Gln Val
 85 90 95
 Leu Glu His Val Ser Asp Ala Asp Ala Tyr Leu Arg Glu Ala Tyr Arg
 100 105 110
 Leu Leu Arg Pro Gly Gly Arg Leu Val Leu Ser Thr His Gly Val Trp
 115 120 125

Glu Glu His Gly Gly Gln Asp Leu Trp Arg Trp Thr Ala Asp Gly Leu
 130 135 140
 Ala Arg Gln Ala Glu Trp Ala Gly Phe Thr Val Asp Arg Thr Val Lys
 145 150 155 160
 Leu Thr Cys Gly Pro Arg Gly Leu Leu Leu Leu Leu Arg Trp Tyr Gly
 165 170 175
 Arg Glu His Gly Trp Pro Ser Gly Gly Pro Val Gly Leu Ala Leu Arg
 180 185 190
 Ala Leu Trp Leu Val Asp Arg Leu Arg Pro Arg Ala Leu Asp Glu Tyr
 195 200 205
 Leu Asp Arg Ala Phe Arg His Leu Gly Arg Ser Glu Gly Pro Asp Gln
 210 215 220
 Pro Phe Tyr Leu Asp Ile Leu Leu Val Ala Ser Lys Pro His Asp Gly
 225 230 235 240
 Ala Pro Gly Pro Ala His Arg His Glu Thr Arg Arg Thr
 245 250

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 <212> DNA
 <213> Micromonospora carbonacea

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 <222> (1)..(942)

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 His Ile His Glu Thr Gly Leu Leu Pro Glu His Leu Thr Ala Phe Arg
 20 25 30
 cgg cag ggc gcg ctg atc ctg cgc ggg ctg ctg gac ccc gac gag ctg 144
 Arg Gln Gly Ala Leu Ile Leu Arg Gly Leu Leu Asp Pro Asp Glu Leu
 35 40 45
 cgg tcc gtg cag gcg gcg gcc gac gag ctg atc gac gaa gcc tgg cgc 192
 Arg Ser Val Gln Ala Ala Ala Asp Glu Leu Ile Asp Glu Ala Trp Arg
 50 55 60
 acc cgg acg atg acc gac acc atc tgg acg ctg gaa ccg cac gag ccg 240
 Thr Arg Thr Met Thr Asp Thr Ile Trp Thr Leu Glu Pro His Glu Pro
 65 70 75 80
 gac gcg gcg ccg gtg cgg atc gag tac gtg gtc gac aag tcc ccg gtg 288
 Asp Ala Ala Pro Val Arg Ile Glu Tyr Val Val Asp Lys Ser Pro Val
 85 90 95
 gtc gcc cgg ctc gcc ggc cac ccc ctg ctg ctg cgg gcg atg gag gac 336

Val	Ala	Arg	Leu	Ala	Gly	His	Pro	Leu	Leu	Leu	Arg	Ala	Met	Glu	Asp		
			100					105					110				
ctg	gtc	ggc	ccc	aac	ctc	atc	ccc	acc	tgg	gac	agc	atg	gtc	ttc	aag	384	
Leu	Val	Gly	Pro	Asn	Leu	Ile	Pro	Thr	Trp	Asp	Ser	Met	Val	Phe	Lys		
		115					120					125					
acc	gag	gcg	ggg	gcg	ccc	cgg	ctg	ccc	tgg	cac	cgc	gac	ggc	ggc	ctc	432	
Thr	Glu	Ala	Gly	Ala	Pro	Arg	Leu	Pro	Trp	His	Arg	Asp	Gly	Gly	Leu		
	130					135					140						
tac	ccg	gag	aac	gcg	gtc	ggc	atc	acc	ggc	gcg	ggc	cgg	gtg	atc	gac	480	
Tyr	Pro	Glu	Asn	Ala	Val	Gly	Ile	Thr	Gly	Ala	Gly	Arg	Val	Ile	Asp		
145					150				155						160		
gtc	ggc	atc	tac	ctt	gac	ccg	gcc	ccg	gag	gac	aac	tgc	gtc	tgg	tgc	528	
Val	Gly	Ile	Tyr	Leu	Asp	Pro	Ala	Pro	Glu	Asp	Asn	Cys	Val	Trp	Cys		
				165					170					175			
atc	ccg	cag	tcg	aac	tac	tgg	gac	acc	gac	cgg	gcg	aac	gag	acc	acc	576	
Ile	Pro	Gln	Ser	Asn	Tyr	Trp	Asp	Thr	Asp	Arg	Ala	Asn	Glu	Thr	Thr		
			180				185						190				
acc	cgg	atg	aac	gcc	acc	gag	tgg	gac	acc	acc	ggg	gcg	gtg	ccg	gcg	624	
Thr	Arg	Met	Asn	Ala	Thr	Glu	Trp	Asp	Thr	Thr	Gly	Ala	Val	Pro	Ala		
		195					200				205						
gtg	atg	aac	ccg	ggc	gac	gtg	atg	ctg	cac	aac	atc	ctg	atg	ctg	cac	672	
Val	Met	Asn	Pro	Gly	Asp	Val	Met	Leu	His	Asn	Ile	Leu	Met	Leu	His		
	210					215					220						
gcc	gcg	ccg	gcg	gtg	acc	ggc	aag	cgg	cgc	cgg	gtc	atc	tac	ttc	gag	720	
Ala	Ala	Pro	Ala	Val	Thr	Gly	Lys	Arg	Arg	Arg	Val	Ile	Tyr	Phe	Glu		
225					230					235					240		
tac	cgg	ccc	gcc	gag	gtc	gag	ctg	gac	ctc	ggc	ccg	cac	gtg	ccg	gag	768	
Tyr	Arg	Pro	Ala	Glu	Val	Glu	Leu	Asp	Leu	Gly	Pro	His	Val	Pro	Glu		
			245					250						255			
tac	atc	ggg	ctc	aag	cag	cag	gtg	ctg	ctc	tcc	tgc	ctg	gcg	cag	cgg	816	
Tyr	Ile	Gly	Leu	Lys	Gln	Gln	Val	Leu	Leu	Ser	Cys	Leu	Ala	Gln	Arg		
			260				265						270				
cgg	gcg	gca	ccg	gag	cac	gcc	ggc	gag	cag	ccc	ttc	gag	tac	cgg	ccc	864	
Arg	Ala	Ala	Pro	Glu	His	Ala	Gly	Glu	Gln	Pro	Phe	Glu	Tyr	Arg	Pro		
		275					280					285					
gcc	gcg	tcg	ctg	cgg	cgc	tgg	gag	ggc	ctg	ccg	gag	ccg	acc	acc	atg	912	
Ala	Ala	Ser	Leu	Arg	Arg	Trp	Glu	Gly	Leu	Pro	Glu	Pro	Thr	Thr	Met		
	290					295					300						
cgg	tac	ccg	cac	gag	gag	tac	tgg	cgt	tgg							942	
Arg	Tyr	Pro	His	Glu	Glu	Tyr	Trp	Arg	Trp								
305					310												

<210> 55

<211> 314

<212> PRT

<213> Micromonospora carbonacea

<220>

<223> evrO

<400> 55

Met 1	Ser	Ala	Thr	Val 5	Asp	Val	Arg	Thr	Glu 10	Gln	Ala	Val	Pro	Glu 15	Cys
His	Ile	His	Glu 20	Thr	Gly	Leu	Leu	Pro 25	Glu	His	Leu	Thr	Ala 30	Phe	Arg
Arg	Gln	Gly 35	Ala	Leu	Ile	Leu	Arg 40	Gly	Leu	Leu	Asp	Pro 45	Asp	Glu	Leu
Arg	Ser 50	Val	Gln	Ala	Ala	Ala 55	Asp	Glu	Leu	Ile	Asp 60	Glu	Ala	Trp	Arg
Thr 65	Arg	Thr	Met	Thr	Asp 70	Thr	Ile	Trp	Thr	Leu 75	Glu	Pro	His	Glu	Pro 80
Asp	Ala	Ala	Pro	Val 85	Arg	Ile	Glu	Tyr	Val 90	Val	Asp	Lys	Ser	Pro 95	Val
Val	Ala	Arg	Leu 100	Ala	Gly	His	Pro	Leu 105	Leu	Leu	Arg	Ala	Met 110	Glu	Asp
Leu	Val	Gly 115	Pro	Asn	Leu	Ile	Pro 120	Thr	Trp	Asp	Ser	Met 125	Val	Phe	Lys
Thr 130	Glu	Ala	Gly	Ala	Pro	Arg 135	Leu	Pro	Trp	His	Arg 140	Asp	Gly	Gly	Leu
Tyr 145	Pro	Glu	Asn	Ala	Val 150	Gly	Ile	Thr	Gly	Ala 155	Gly	Arg	Val	Ile	Asp 160
Val	Gly	Ile	Tyr	Leu 165	Asp	Pro	Ala	Pro	Glu 170	Asp	Asn	Cys	Val	Trp 175	Cys
Ile	Pro	Gln	Ser 180	Asn	Tyr	Trp	Asp	Thr 185	Asp	Arg	Ala	Asn	Glu 190	Thr	Thr
Thr	Arg	Met 195	Asn	Ala	Thr	Glu	Trp 200	Asp	Thr	Thr	Gly	Ala 205	Val	Pro	Ala
Val	Met 210	Asn	Pro	Gly	Asp	Val 215	Met	Leu	His	Asn	Ile 220	Leu	Met	Leu	His
Ala 225	Ala	Pro	Ala	Val	Thr 230	Gly	Lys	Arg	Arg	Arg 235	Val	Ile	Tyr	Phe	Glu 240
Tyr	Arg	Pro	Ala	Glu 245	Val	Glu	Leu	Asp	Leu 250	Gly	Pro	His	Val	Pro 255	Glu
Tyr	Ile	Gly	Leu 260	Lys	Gln	Gln	Val	Leu 265	Leu	Ser	Cys	Leu	Ala 270	Gln	Arg
Arg	Ala	Ala 275	Pro	Glu	His	Ala	Gly 280	Glu	Gln	Pro	Phe	Glu 285	Tyr	Arg	Pro
Ala	Ala 290	Ser	Leu	Arg	Arg	Trp 295	Glu	Gly	Leu	Pro	Glu 300	Pro	Thr	Thr	Met
Arg 305	Tyr	Pro	His	Glu	Glu 310	Tyr	Trp	Arg	Trp						

<210> 56
<211> 726
<212> DNA

<213> Micromonospora carbonacea

<220>

<221> CDS

<222> (1)..(726)

<220>

<223> evrP

<400> 56

atg aac gac tgg tac gac cag ctc acc gtg gcg ctg atc gag cag atc	48
Met Asn Asp Trp Tyr Asp Gln Leu Thr Val Ala Leu Ile Glu Gln Ile	
1 5 10 15	
tgc gaa ccg gac gcc aac acc gtg gac atc ggg gcc ggc gcc ggc gac	96
Cys Glu Pro Asp Ala Asn Thr Val Asp Ile Gly Ala Gly Ala Gly Asp	
20 25 30	
atc ctg cgt cac ctg ctg cgg gtc gcc ccc cgt ggc cgg cac gtg gcc	144
Ile Leu Arg His Leu Leu Arg Val Ala Pro Arg Gly Arg His Val Ala	
35 40 45	
gtc gag gcg ctg ccg tcg tac gcc gag ggg ctg cgc cgg gac ttc ccc	192
Val Glu Ala Leu Pro Ser Tyr Ala Glu Gly Leu Arg Arg Asp Phe Pro	
50 55 60	
ggc gtg acg gtg gtg gcc gcc gcc gcc gcc gag cgc acc ggc cgg gac	240
Gly Val Thr Val Val Ala Ala Ala Ala Ala Glu Arg Thr Gly Arg Asp	
65 70 75 80	
agc ttc gtc cac gtg gtc tcc aac ccc ggc tac agc ggg ctg cgc cgg	288
Ser Phe Val His Val Val Ser Asn Pro Gly Tyr Ser Gly Leu Arg Arg	
85 90 95	
cgt ccc tac gac cgc ccg gac gag acc ctg cgg gag ctg acg gtc gac	336
Arg Pro Tyr Asp Arg Pro Asp Glu Thr Leu Arg Glu Leu Thr Val Asp	
100 105 110	
acc gtc cgc ctg gac gac gtg ctc ccc ggt gac cgc cgg atc gac ctg	384
Thr Val Arg Leu Asp Asp Val Leu Pro Gly Asp Arg Arg Ile Asp Leu	
115 120 125	
gtc aag gtg gac acc gag ggc ggc gag gtg ctc gcc ctg cgc ggt gcc	432
Val Lys Val Asp Thr Glu Gly Gly Glu Val Leu Ala Leu Arg Gly Ala	
130 135 140	
gtg gag ctg ctc cgc cgc tgg cgg ccg gtg atc gtc ttc gag cac ggc	480
Val Glu Leu Leu Arg Arg Trp Arg Pro Val Ile Val Phe Glu His Gly	
145 150 155 160	
ggc gac cac gcc atg cgg gag tac ggc acc acc agc gcc gac ctg tgg	528
Gly Asp His Ala Met Arg Glu Tyr Gly Thr Thr Ser Ala Asp Leu Trp	
165 170 175	
gcg ctg ctc gtg acc gag ctg ggt tac gag ctg cgt acc ctg ccc ggg	576
Ala Leu Leu Val Thr Glu Leu Gly Tyr Glu Leu Arg Thr Leu Pro Gly	
180 185 190	
cgc cgc gcc ggg cag ccg gcg ctg gac cgg gcg ggg ttc gcc gac gcg	624
Arg Arg Ala Gly Gln Pro Ala Leu Asp Arg Ala Gly Phe Ala Asp Ala	
195 200 205	
ctg cgg gag cac tgg tac ttc gtc gcc gac cga ccg agc ccg ggc ccg	672
Leu Arg Glu His Trp Tyr Phe Val Ala Asp Arg Pro Ser Pro Gly Pro	
210 215 220	

gcc ggc ggc tcc ggg cag cac gaa ccg tcc gcc tgg cag aag gga acc 720
 Ala Gly Gly Ser Gly Gln His Glu Pro Ser Ala Trp Gln Lys Gly Thr
 225 230 235 240

gaa cca 726
 Glu Pro

<210> 57

<211> 242

<212> PRT

<213> Micromonospora carbonacea

<220>

<223> evrP

<400> 57

Met Asn Asp Trp Tyr Asp Gln Leu Thr Val Ala Leu Ile Glu Gln Ile
 1 5 10 15

Cys Glu Pro Asp Ala Asn Thr Val Asp Ile Gly Ala Gly Ala Gly Asp
 20 25 30

Ile Leu Arg His Leu Leu Arg Val Ala Pro Arg Gly Arg His Val Ala
 35 40 45

Val Glu Ala Leu Pro Ser Tyr Ala Glu Gly Leu Arg Arg Asp Phe Pro
 50 55 60

Gly Val Thr Val Val Ala Ala Ala Ala Ala Glu Arg Thr Gly Arg Asp
 65 70 75 80

Ser Phe Val His Val Val Ser Asn Pro Gly Tyr Ser Gly Leu Arg Arg
 85 90 95

Arg Pro Tyr Asp Arg Pro Asp Glu Thr Leu Arg Glu Leu Thr Val Asp
 100 105 110

Thr Val Arg Leu Asp Asp Val Leu Pro Gly Asp Arg Arg Ile Asp Leu
 115 120 125

Val Lys Val Asp Thr Glu Gly Gly Glu Val Leu Ala Leu Arg Gly Ala
 130 135 140

Val Glu Leu Leu Arg Arg Trp Arg Pro Val Ile Val Phe Glu His Gly
 145 150 155 160

Gly Asp His Ala Met Arg Glu Tyr Gly Thr Thr Ser Ala Asp Leu Trp
 165 170 175

Ala Leu Leu Val Thr Glu Leu Gly Tyr Glu Leu Arg Thr Leu Pro Gly
 180 185 190

Arg Arg Ala Gly Gln Pro Ala Leu Asp Arg Ala Gly Phe Ala Asp Ala
 195 200 205

Leu Arg Glu His Trp Tyr Phe Val Ala Asp Arg Pro Ser Pro Gly Pro
 210 215 220

Ala Gly Gly Ser Gly Gln His Glu Pro Ser Ala Trp Gln Lys Gly Thr
 225 230 235 240

Glu Pro

<210> 58
 <211> 1026
 <212> DNA
 <213> Micromonospora carbonacea

<220>
 <221> CDS
 <222> (1)..(1026)

<220>
 <223> evrQ

<400> 58
 gtg cgg cag cgc tgc atc ggt gag cgg ggg ccg ctg gtc tcg gcg ctc 48
 Val Arg Gln Arg Cys Ile Gly Glu Arg Gly Pro Leu Val Ser Ala Leu
 1 5 10 15

ggc ctg ggc acc tgg gcg ctc ggc ggc cag tgg ggc cgg cgg atc gaa 96
 Gly Leu Gly Thr Trp Ala Leu Gly Gly Gln Trp Gly Arg Arg Ile Glu
 20 25 30

cca ggc gtg cag gcc gtc cgc cgg gcc ttc gac ctg ggc gtc acc ctt 144
 Pro Gly Val Gln Ala Val Arg Arg Ala Phe Asp Leu Gly Val Thr Leu
 35 40 45

ttc gac acc tcc cgg gcg tac ggc ggc ggg gcc gcc gag gcg gcc ctt 192
 Phe Asp Thr Ser Arg Ala Tyr Gly Gly Gly Ala Ala Glu Ala Ala Leu
 50 55 60

gcc cgc ggg ctg gcc gac ctg ttg ccc gcg cac cgg gac gag atc gtg 240
 Ala Arg Gly Leu Ala Asp Leu Leu Pro Ala His Arg Asp Glu Ile Val
 65 70 75 80

atc gcc acg gcc ggc ggg ctg gag acc cgg ccc ggc gtg cga cgg cac 288
 Ile Ala Thr Ala Gly Gly Leu Glu Thr Arg Pro Gly Val Arg Arg His
 85 90 95

aag ctc gac ccg ccc gga cgg acg gtg cgt aac agc gac ccc gcg ttc 336
 Lys Leu Asp Pro Pro Gly Arg Thr Val Arg Asn Ser Asp Pro Ala Phe
 100 105 110

ctc cgg gac gag ctg ctg gcc agc ctg cgt cag ctc ggc acg gac cac 384
 Leu Arg Asp Glu Leu Leu Ala Ser Leu Arg Gln Leu Gly Thr Asp His
 115 120 125

gtc gac gtg tac tcc gtg cac tgg ccc gac ccg acc gtc ccg ctc gcg 432
 Val Asp Val Tyr Ser Val His Trp Pro Asp Pro Thr Val Pro Leu Ala
 130 135 140

gag acc gcc gag gtg ctg gcg ggg ttc gtg cgc gag ggc ctg gcc cgc 480
 Glu Thr Ala Glu Val Leu Ala Gly Phe Val Arg Glu Gly Leu Ala Arg
 145 150 155 160

cat gtc ggc ttc gcc aac gtg acg gcg ggc gac ctg gcc gag ctg gtg 528
 His Val Gly Phe Ala Asn Val Thr Ala Gly Asp Leu Ala Glu Leu Val
 165 170 175

ccg acc ggg ctg ctg gac gtc gtc cag gtg ccg ttc aac ctg ctc gac 576
 Pro Thr Gly Leu Leu Asp Val Val Gln Val Pro Phe Asn Leu Leu Asp
 180 185 190

cgt ggt gcc gag aag gag gtg ctg ccc cgc tgc cag gag gcc ggc gtc 624
 Arg Gly Ala Glu Lys Glu Val Leu Pro Arg Cys Gln Glu Ala Gly Val

195	200	205	
ggg gtg ctg ggc ggc tcc gcg ctc gcc cac ggg ctg ctc acc ggc gcg Gly Val Leu Gly Gly Ser Ala Leu Ala His Gly Leu Leu Thr Gly Ala	210	215	220 672
ctg cac cgc gac cag gca ttc gcc ccc gag gac tgg cgg gcc tac tcg Leu His Arg Asp Gln Ala Phe Ala Pro Glu Asp Trp Arg Ala Tyr Ser	225	230	235 240 720
cac gcc ttc cgg ggt gag gac tac gcc caa ctg ctc gac gtg gtc gac His Ala Phe Arg Gly Glu Asp Tyr Ala Gln Leu Leu Asp Val Val Asp	245	250	255 768
ggc ctc gcc gcc ttc gcc gcc gag cgt ggg cac acc gtc gcg cag gtg Gly Leu Ala Ala Phe Ala Ala Glu Arg Gly His Thr Val Ala Gln Val	260	265	270 816
gca ctg gcc tgg gcg ctg cac cac ccg gcc ggg gtg gtg ccg gtg ttc Ala Leu Ala Trp Ala Leu His His Pro Ala Gly Val Val Pro Val Phe	275	280	285 864
ggc gct cag tcg ccc gga gtc gtc gag gag aac gtc cgc gcc gcc ggc Gly Ala Gln Ser Pro Gly Val Val Glu Glu Asn Val Arg Ala Ala Gly	290	295	300 912
ctg gag ctg tcc gag atc gag ctg ccg gag ctg gaa ctc ctg gtc cgt Leu Glu Leu Ser Glu Ile Glu Leu Arg Glu Leu Glu Leu Leu Val Arg	305	310	315 320 960
acc gcc ccg gcg gtc ggc tcc ggg gcc gga ccg gcg tgc ccg acc gag Thr Ala Pro Ala Val Gly Ser Gly Ala Gly Pro Ala Cys Arg Thr Glu	325	330	335 1008
gag cgt gac gat gtc cac Glu Arg Asp Asp Val His	340		1026

<210> 59
 <211> 342
 <212> PRT
 <213> Micromonospora carbonacea

<220>
 <223> evrQ

<400> 59
 Val Arg Gln Arg Cys Ile Gly Glu Arg Gly Pro Leu Val Ser Ala Leu
 1 5 10 15
 Gly Leu Gly Thr Trp Ala Leu Gly Gly Gln Trp Gly Arg Arg Ile Glu
 20 25 30
 Pro Gly Val Gln Ala Val Arg Arg Ala Phe Asp Leu Gly Val Thr Leu
 35 40 45
 Phe Asp Thr Ser Arg Ala Tyr Gly Gly Gly Ala Ala Glu Ala Ala Leu
 50 55 60
 Ala Arg Gly Leu Ala Asp Leu Leu Pro Ala His Arg Asp Glu Ile Val
 65 70 75 80
 Ile Ala Thr Ala Gly Gly Leu Glu Thr Arg Pro Gly Val Arg Arg His
 85 90 95

Lys Leu Asp Pro Pro Gly Arg Thr Val Arg Asn Ser Asp Pro Ala Phe
 100 105 110
 Leu Arg Asp Glu Leu Leu Ala Ser Leu Arg Gln Leu Gly Thr Asp His
 115 120 125
 Val Asp Val Tyr Ser Val His Trp Pro Asp Pro Thr Val Pro Leu Ala
 130 135 140
 Glu Thr Ala Glu Val Leu Ala Gly Phe Val Arg Glu Gly Leu Ala Arg
 145 150 155 160
 His Val Gly Phe Ala Asn Val Thr Ala Gly Asp Leu Ala Glu Leu Val
 165 170 175
 Pro Thr Gly Leu Leu Asp Val Val Gln Val Pro Phe Asn Leu Leu Asp
 180 185 190
 Arg Gly Ala Glu Lys Glu Val Leu Pro Arg Cys Gln Glu Ala Gly Val
 195 200 205
 Gly Val Leu Gly Gly Ser Ala Leu Ala His Gly Leu Leu Thr Gly Ala
 210 215 220
 Leu His Arg Asp Gln Ala Phe Ala Pro Glu Asp Trp Arg Ala Tyr Ser
 225 230 235 240
 His Ala Phe Arg Gly Glu Asp Tyr Ala Gln Leu Leu Asp Val Val Asp
 245 250 255
 Gly Leu Ala Ala Phe Ala Ala Glu Arg Gly His Thr Val Ala Gln Val
 260 265 270
 Ala Leu Ala Trp Ala Leu His His Pro Ala Gly Val Val Pro Val Phe
 275 280 285
 Gly Ala Gln Ser Pro Gly Val Val Glu Glu Asn Val Arg Ala Ala Gly
 290 295 300
 Leu Glu Leu Ser Glu Ile Glu Leu Arg Glu Leu Glu Leu Leu Val Arg
 305 310 315 320
 Thr Ala Pro Ala Val Gly Ser Gly Ala Gly Pro Ala Cys Arg Thr Glu
 325 330 335
 Glu Arg Asp Asp Val His
 340

<210> 60
 <211> 492
 <212> DNA
 <213> Micromonospora carbonacea

<220>
 <221> CDS
 <222> (1)..(492)

<220>
 <223> evrR

<400> 60
 atg gcg gcc ggg ctc gcc gac cgg gtg cgc gcc gtg ctc tgc gcc gac 48

Met	Ala	Ala	Gly	Leu	Ala	Asp	Arg	Val	Arg	Ala	Val	Leu	Cys	Ala	Asp	
1				5					10					15		
gtc	agc	cga	tcc	ttc	ctc	gac	aag	gcg	cgc	gcc	acc	tgc	gag	ggc	cgg	96
Val	Ser	Arg	Ser	Phe	Leu	Asp	Lys	Ala	Arg	Ala	Thr	Cys	Glu	Gly	Arg	
			20					25					30			
gag	aac	gtc	tcc	tac	cac	cac	atc	gag	aac	gac	ttc	ctg	gag	aag	ctg	144
Glu	Asn	Val	Ser	Tyr	His	His	Ile	Glu	Asn	Asp	Phe	Leu	Glu	Lys	Leu	
		35					40					45				
ccg	acc	gcc	gcg	ttc	gac	gcc	ggg	ttc	tcc	ctg	aac	gtg	ttc	atc	cac	192
Pro	Thr	Ala	Ala	Phe	Asp	Ala	Gly	Phe	Ser	Leu	Asn	Val	Phe	Ile	His	
	50					55					60					
ctc	aac	gtc	ttc	gag	gtc	ttc	ctc	tac	ttc	cgt	cag	atc	cgg	cgg	atc	240
Leu	Asn	Val	Phe	Glu	Val	Phe	Leu	Tyr	Phe	Arg	Gln	Ile	Arg	Arg	Ile	
65					70					75					80	
ctg	cgg	ccc	ggc	ggg	ctg	ttc	tgc	ttc	aac	ttc	ctg	gac	ctc	ggc	gac	288
Leu	Arg	Pro	Gly	Gly	Leu	Phe	Cys	Phe	Asn	Phe	Leu	Asp	Leu	Gly	Asp	
			85						90					95		
aac	acg	cgc	ggc	ttc	ttc	cac	acc	tac	gcc	gag	cgg	tac	cgc	gac	gcg	336
Asn	Thr	Arg	Gly	Phe	Phe	His	Thr	Tyr	Ala	Glu	Arg	Tyr	Arg	Asp	Ala	
			100					105					110			
aac	ccc	gtg	gag	ttc	aag	ggg	ttc	ctg	aac	tgg	cac	ggc	gtg	gag	ttg	384
Asn	Pro	Val	Glu	Phe	Lys	Gly	Phe	Leu	Asn	Trp	His	Gly	Val	Glu	Leu	
		115					120					125				
atg	acc	ggc	atc	gcc	gcc	gag	gcc	ggg	ctg	acg	ccg	gtc	acc	gac	aag	432
Met	Thr	Gly	Ile	Ala	Ala	Glu	Ala	Gly	Leu	Thr	Pro	Val	Thr	Asp	Lys	
	130					135					140					
atg	atc	aat	cac	gac	ggc	gtg	gtg	ttc	ctg	acg	ctg	cgc	agc	gac	ggg	480
Met	Ile	Asn	His	Asp	Gly	Val	Val	Phe	Leu	Thr	Leu	Arg	Ser	Asp	Gly	
145					150					155					160	
gag	ccg	gcg	gcg													492
Glu	Pro	Ala	Ala													

<210> 61

<211> 164

<212> PRT

<213> Micromonospora carbonacea

<220>

<223> evrR

<400> 61

Met	Ala	Ala	Gly	Leu	Ala	Asp	Arg	Val	Arg	Ala	Val	Leu	Cys	Ala	Asp	
1				5					10					15		
Val	Ser	Arg	Ser	Phe	Leu	Asp	Lys	Ala	Arg	Ala	Thr	Cys	Glu	Gly	Arg	
			20					25					30			
Glu	Asn	Val	Ser	Tyr	His	His	Ile	Glu	Asn	Asp	Phe	Leu	Glu	Lys	Leu	
		35					40					45				
Pro	Thr	Ala	Ala	Phe	Asp	Ala	Gly	Phe	Ser	Leu	Asn	Val	Phe	Ile	His	
	50					55					60					
Leu	Asn	Val	Phe	Glu	Val	Phe	Leu	Tyr	Phe	Arg	Gln	Ile	Arg	Arg	Ile	

65		70		75		80									
Leu	Arg	Pro	Gly	Gly	Leu	Phe	Cys	Phe	Asn	Phe	Leu	Asp	Leu	Gly	Asp
			85						90					95	
Asn	Thr	Arg	Gly	Phe	Phe	His	Thr	Tyr	Ala	Glu	Arg	Tyr	Arg	Asp	Ala
			100					105					110		
Asn	Pro	Val	Glu	Phe	Lys	Gly	Phe	Leu	Asn	Trp	His	Gly	Val	Glu	Leu
		115				120						125			
Met	Thr	Gly	Ile	Ala	Ala	Glu	Ala	Gly	Leu	Thr	Pro	Val	Thr	Asp	Lys
	130					135					140				
Met	Ile	Asn	His	Asp	Gly	Val	Val	Phe	Leu	Thr	Leu	Arg	Ser	Asp	Gly
145					150					155					160
Glu	Pro	Ala	Ala												

<210> 62
 <211> 1269
 <212> DNA
 <213> Micromonospora carbonacea

<220>
 <221> CDS
 <222> (1) .. (1269)

<220>
 <223> evrS

<400> 62																	
atg	aag	gtt	ctg	ttc	acc	gtg	tcc	aac	tgg	gcc	ggg	cac	tac	atg	tgc		48
Met	Lys	Val	Leu	Phe	Thr	Val	Ser	Asn	Trp	Ala	Gly	His	Tyr	Met	Cys		
1				5					10					15			
atg	gtg	ccg	ctg	gcc	tgg	gcg	ctg	cgg	gcg	gcc	ggc	cac	gac	gtc	aag		96
Met	Val	Pro	Leu	Ala	Trp	Ala	Leu	Arg	Ala	Ala	Gly	His	Asp	Val	Lys		
			20					25					30				
gtc	gcc	tgt	tcg	ccg	tcc	cag	gtc	cgg	ggc	gtg	gcc	gcg	gcg	ggc	atg		144
Val	Ala	Cys	Ser	Pro	Ser	Gln	Val	Arg	Gly	Val	Ala	Ala	Ala	Gly	Met		
		35				40					45						
atg	ccc	gtc	tcg	gtg	ctc	gac	gga	ccc	gac	atg	atg	gag	agc	gcc	cgg		192
Met	Pro	Val	Ser	Val	Leu	Asp	Gly	Pro	Asp	Met	Met	Glu	Ser	Ala	Arg		
	50					55					60						
ctg	ggc	ttc	tac	gtc	cag	gcc	ctc	tac	acc	ccg	cag	cac	atg	gtg	gag		240
Leu	Gly	Phe	Tyr	Val	Gln	Ala	Leu	Tyr	Thr	Pro	Gln	His	Met	Val	Glu		
65					70					75					80		
caa	ccg	ctg	ccg	ttg	aac	ccc	ttc	acg	ggc	cgg	ccg	atg	gac	tcg	ctc		288
Gln	Pro	Leu	Pro	Leu	Asn	Pro	Phe	Thr	Gly	Arg	Pro	Met	Asp	Ser	Leu		
				85					90					95			
gcc	gac	ttc	gac	acc	gac	ctg	ctc	gcc	gac	tac	tgg	aag	cgc	acg	gtc		336
Ala	Asp	Phe	Asp	Thr	Asp	Leu	Leu	Ala	Asp	Tyr	Trp	Lys	Arg	Thr	Val		
			100					105					110				
acc	gcg	gtc	cag	cgc	agc	tac	gac	aac	gcg	gtc	gac	tac	gcc	gcc	cac		384
Thr	Ala	Val	Gln	Arg	Ser	Tyr	Asp	Asn	Ala	Val	Asp	Tyr	Ala	Ala	His		

	115				120				125							
tac Tyr	cgg Arg 130	ccc Pro	gac Asp	ctg Leu	gtg Val	gtc Val 135	cac His	gac Asp	atc Ile	atg Met	gcc Ala 140	gtg Val	gag Glu	ggc Gly	gcg Ala	432
ctg Leu 145	gtc Val	gcc Ala	gag Glu	ctg Leu	cac His 150	cac His	atc Ile	ccc Pro	agc Ser	gtc Val 155	tac Tyr	ttc Phe	tcg Ser	ccc Pro	ggg Gly 160	480
ttc Phe	atc Ile	ggc Gly	acc Thr	atc Ile 165	gag Glu	acc Thr	gag Glu	ccc Pro	ggg Gly 170	ctc Leu	gac Asp	ctg Leu	gtc Val	tcc Ser 175	ggc Gly	528
gac Asp	ccg Pro	gtg Val	acc Thr 180	gag Glu	ttc Phe	cgc Arg	aag Lys	tac Tyr 185	ggc Gly	gtc Val	gag Glu	tgg Trp 190	agc Ser	ccg Arg	cac His	576
cag Gln	atc Ile	cgg Arg 195	tac Tyr	gcc Ala	atc Ile	gac Asp	ccg Pro 200	tcg Ser	ccc Pro	gac Asp	gtg Val	gcg Ala 205	atc Ile	ccg Pro	ccg Pro	624
atg Met	ggc Gly 210	gac Asp	gcg Ala	ctg Leu	cgg Arg	atc Ile 215	ccg Pro	atc Ile	cgc Arg	tac Tyr	cag Gln 220	ccc Pro	tac Tyr	aac Asn	ggc Gly	672
tcc Ser 225	cag Gln	gac Asp	gtg Val	gac Asp	ccc Pro 230	tgg Trp	ctg Leu	ctc Leu	ggg Gly	ccg Pro 235	cgc Arg	cgg Arg	ggc Gly	aag Lys	cgg Arg 240	720
gtc Val	tgc Cys	gtg Val	gtg Val	tgg Trp 245	ggc Gly	aac Asn	tcc Ser	gcc Ala	acg Thr 250	ggc Gly	gtg Val	ttc Phe	ggc Gly	gcg Ala 255	cag Gln	768
gtg Val	ccg Pro	gcg Ala	ctg Leu 260	cgg Arg	cac His	gcc Ala	gtc Val	gac Asp 265	gcc Ala	gcc Ala	gcc Ala	cag Gln	cgg Arg 270	ggc Gly	gtg Val	816
gag Glu	gtc Val	gtg Val 275	atc Ile	acc Thr	gcc Ala	gcc Ala	tcc Ser 280	tcc Ser	gag Glu	gtg Val	gag Glu	ggg Gly 285	ctg Leu	ggc Gly	gcg Ala	864
ctg Leu	ccg Pro 290	ccg Pro	aac Asn	gtg Val	cgg Arg	gtg Val 295	ctc Leu	agc Ser	aac Asn	tgc Cys	ccg Pro 300	ctg Leu	gag Glu	ctc Leu	atc Ile	912
ctc Leu 305	ccc Pro	gac Asp	tgc Cys	gac Asp	ttg Leu 310	ctg Leu	gtg Val	cac His	cac His	ggc Gly 315	agc Ser	gcc Ala	aac Asn	tgc Cys	tac Tyr 320	960
atg Met	aac Asn	ggg Gly	ctc Leu	gcc Ala 325	atg Met	ggc Gly	gtg Val	ccg Pro	cag Gln 330	ttg Leu	tcg Ser	ctg Leu	gcg Ala	ctc Leu 335	aac Asn	1008
tac Tyr	gac Asp	gcc Ala	ctg Leu 340	atc Ile	tac Tyr	ggg Gly	cgg Arg	cgg Arg	ctc Leu	gac Asp	ccg Pro	cag Gln	ggc Gly 350	gcg Ala	acg Thr	1056
aag Lys	acg Thr	ctg Leu 355	ccc Pro	ggc Gly	ctg Leu	aag Lys	gcg Ala 360	tcc Ser	cgc Arg	gag Glu	gag Glu	gtc Val 365	gac Asp	gag Glu	gcc Ala	1104
ctc Leu	ggc Gly 370	tcc Ser	gtc Val	ctc Leu	tac Tyr	gac Asp 375	cac His	cga Arg	ttc Phe	cgg Arg	gtg Val 380	gcg Ala	gcg Ala	cag Gln	cgg Arg	1152

atg cgg gag tcc gtc acc acc ggg ccg acc gcc gtc cag gtg gcc gaa 1200
 Met Arg Glu Ser Val Thr Thr Gly Pro Thr Ala Val Gln Val Ala Glu
 385 390 395 400

ctc ctg gcc cgg ctg gcc gac acc ggc gcg ctg agc ccc gag gac gtc 1248
 Leu Leu Ala Arg Leu Ala Asp Thr Gly Ala Leu Ser Pro Glu Asp Val
 405 410 415

gcc gag ttc gcc cgg cgt ccg 1269
 Ala Glu Phe Ala Arg Arg Pro
 420

<210> 63
 <211> 423
 <212> PRT
 <213> Micromonospora carbonacea

<220>
 <223> evrS

<400> 63
 Met Lys Val Leu Phe Thr Val Ser Asn Trp Ala Gly His Tyr Met Cys
 1 5 10 15
 Met Val Pro Leu Ala Trp Ala Leu Arg Ala Ala Gly His Asp Val Lys
 20 25 30
 Val Ala Cys Ser Pro Ser Gln Val Arg Gly Val Ala Ala Ala Gly Met
 35 40 45
 Met Pro Val Ser Val Leu Asp Gly Pro Asp Met Met Glu Ser Ala Arg
 50 55 60
 Leu Gly Phe Tyr Val Gln Ala Leu Tyr Thr Pro Gln His Met Val Glu
 65 70 75 80
 Gln Pro Leu Pro Leu Asn Pro Phe Thr Gly Arg Pro Met Asp Ser Leu
 85 90 95
 Ala Asp Phe Asp Thr Asp Leu Leu Ala Asp Tyr Trp Lys Arg Thr Val
 100 105 110
 Thr Ala Val Gln Arg Ser Tyr Asp Asn Ala Val Asp Tyr Ala Ala His
 115 120 125
 Tyr Arg Pro Asp Leu Val Val His Asp Ile Met Ala Val Glu Gly Ala
 130 135 140
 Leu Val Ala Glu Leu His His Ile Pro Ser Val Tyr Phe Ser Pro Gly
 145 150 155 160
 Phe Ile Gly Thr Ile Glu Thr Glu Pro Gly Leu Asp Leu Val Ser Gly
 165 170 175
 Asp Pro Val Thr Glu Phe Arg Lys Tyr Gly Val Glu Trp Ser Arg His
 180 185 190
 Gln Ile Arg Tyr Ala Ile Asp Pro Ser Pro Asp Val Ala Ile Pro Pro
 195 200 205
 Met Gly Asp Ala Leu Arg Ile Pro Ile Arg Tyr Gln Pro Tyr Asn Gly
 210 215 220

Ser Gln Asp Val Asp Pro Trp Leu Leu Gly Pro Arg Arg Gly Lys Arg
 225 230 235 240
 Val Cys Val Val Trp Gly Asn Ser Ala Thr Gly Val Phe Gly Ala Gln
 245 250 255
 Val Pro Ala Leu Arg His Ala Val Asp Ala Ala Ala Gln Arg Gly Val
 260 265 270
 Glu Val Val Ile Thr Ala Ala Ser Ser Glu Val Glu Gly Leu Gly Ala
 275 280 285
 Leu Pro Pro Asn Val Arg Val Leu Ser Asn Cys Pro Leu Glu Leu Ile
 290 295 300
 Leu Pro Asp Cys Asp Leu Leu Val His His Gly Ser Ala Asn Cys Tyr
 305 310 315 320
 Met Asn Gly Leu Ala Met Gly Val Pro Gln Leu Ser Leu Ala Leu Asn
 325 330 335
 Tyr Asp Ala Leu Ile Tyr Gly Arg Arg Leu Asp Pro Gln Gly Ala Thr
 340 345 350
 Lys Thr Leu Pro Gly Leu Lys Ala Ser Arg Glu Glu Val Asp Glu Ala
 355 360 365
 Leu Gly Ser Val Leu Tyr Asp His Arg Phe Arg Val Ala Ala Gln Arg
 370 375 380
 Met Arg Glu Ser Val Thr Thr Gly Pro Thr Ala Val Gln Val Ala Glu
 385 390 395 400
 Leu Leu Ala Arg Leu Ala Asp Thr Gly Ala Leu Ser Pro Glu Asp Val
 405 410 415
 Ala Glu Phe Ala Arg Arg Pro
 420

<210> 64
 <211> 672
 <212> DNA
 <213> Micromonospora carbonacea

<220>
 <221> CDS
 <222> (1)..(672)

<220>
 <223> evrT

<400> 64
 atg acc acc atg tcg cgg gag cgc gag gcc gtg gcc agc cgg ttc cgc 48
 Met Thr Thr Met Ser Arg Glu Arg Glu Ala Val Ala Ser Arg Phe Arg
 1 5 10 15
 agc gac ggg atc gcg cac gtc ggg ccg gtg ctc gac ccc gag gtg ctg 96
 Ser Asp Gly Ile Ala His Val Gly Pro Val Leu Asp Pro Glu Val Leu
 20 25 30
 gcc cag ctc aag gcc ggc gcg gta agc ctg atc gac cgg ttc gcc ggt 144
 Ala Gln Leu Lys Ala Gly Ala Val Ser Leu Ile Asp Arg Phe Ala Gly
 35 40 45

ccg gcg cgg gcc aac gcc gac tac tgg aac tac gag gtc gag ggc gcg 192
 Pro Ala Arg Ala Asn Ala Asp Tyr Trp Asn Tyr Glu Val Glu Gly Ala
 50 55 60

gag ccg gtg ctg tac cgg atc cac aac ctc gaa aag cag gac tgg ccg 240
 Glu Pro Val Leu Tyr Arg Ile His Asn Leu Glu Lys Gln Asp Trp Pro
 65 70 75 80

cag ggc gag ttg ctg cac cgg ccg gag atc gcc gcg gtg gcc gcc gac 288
 Gln Gly Glu Leu Leu His Arg Pro Glu Ile Ala Ala Val Ala Ala Asp
 85 90 95

gtc ctc ggc acc ccg gtc gtg ccc acc gcc ttc gcg ttg gtg ctc aag 336
 Val Leu Gly Thr Pro Val Val Pro Thr Ala Phe Ala Leu Val Leu Lys
 100 105 110

gag cca ctg cgg gcg gcc ggc gtg ccg tgg cac cgg gac cgg gtc aac 384
 Glu Pro Leu Arg Ala Ala Gly Val Pro Trp His Arg Asp Arg Val Asn
 115 120 125

gtc ccc ccg cac gcg gtc tgc aac atc agc atc tgc ctg gac acc gcc 432
 Val Pro Pro His Ala Val Cys Asn Ile Ser Ile Cys Leu Asp Thr Ala
 130 135 140

ggg ccg gag aac ggc tgt ctg gag ggc gtg ccc ggc tcc cac ctg ctg 480
 Gly Pro Glu Asn Gly Cys Leu Glu Gly Val Pro Gly Ser His Leu Leu
 145 150 155 160

ccc gac gac gcc gac gtc acg gcc gtg cgc gac gcc ggg ccg cgg gtg 528
 Pro Asp Asp Ala Asp Val Thr Ala Val Arg Asp Ala Gly Pro Arg Val
 165 170 175

ccg gtc ccc tcg cag gag ggg gac ttc atc gtc cac gac gta cgg ctg 576
 Pro Val Pro Ser Gln Glu Gly Asp Phe Ile Val His Asp Val Arg Leu
 180 185 190

gtg cac ggc tcc ggg ccg aac ccc tcc gac cag tgg cgg cgc acc atc 624
 Val His Gly Ser Gly Pro Asn Pro Ser Asp Gln Trp Arg Arg Thr Ile
 195 200 205

gtg atc gag ttc gcc gat ccc gcg cgg gag ttg ccg gtc ctg acc tcc 672
 Val Ile Glu Phe Ala Asp Pro Ala Arg Glu Leu Pro Val Leu Thr Ser
 210 215 220

<210> 65

<211> 224

<212> PRT

<213> Micromonospora carbonacea

<220>

<223> evrT

<400> 65

Met Thr Thr Met Ser Arg Glu Arg Glu Ala Val Ala Ser Arg Phe Arg
1 5 10 15

Ser Asp Gly Ile Ala His Val Gly Pro Val Leu Asp Pro Glu Val Leu
20 25 30

Ala Gln Leu Lys Ala Gly Ala Val Ser Leu Ile Asp Arg Phe Ala Gly
35 40 45

Pro Ala Arg Ala Asn Ala Asp Tyr Trp Asn Tyr Glu Val Glu Gly Ala

50		55		60											
Glu 65	Pro	Val	Leu	Tyr	Arg 70	Ile	His	Asn	Leu	Glu 75	Lys	Gln	Asp	Trp	Pro 80
Gln	Gly	Glu	Leu	Leu 85	His	Arg	Pro	Glu	Ile 90	Ala	Ala	Val	Ala	Ala	Asp 95
Val	Leu	Gly	Thr 100	Pro	Val	Val	Pro	Thr 105	Ala	Phe	Ala	Leu	Val 110	Leu	Lys
Glu	Pro	Leu 115	Arg	Ala	Ala	Gly	Val 120	Pro	Trp	His	Arg	Asp 125	Arg	Val	Asn
Val	Pro 130	Pro	His	Ala	Val	Cys 135	Asn	Ile	Ser	Ile	Cys 140	Leu	Asp	Thr	Ala
Gly 145	Pro	Glu	Asn	Gly	Cys 150	Leu	Glu	Gly	Val	Pro 155	Gly	Ser	His	Leu	Leu 160
Pro	Asp	Asp	Ala	Asp 165	Val	Thr	Ala	Val	Arg 170	Asp	Ala	Gly	Pro	Arg 175	Val
Pro	Val	Pro	Ser 180	Gln	Glu	Gly	Asp	Phe 185	Ile	Val	His	Asp	Val 190	Arg	Leu
Val	His	Gly 195	Ser	Gly	Pro	Asn 200	Pro	Ser	Asp	Gln	Trp	Arg 205	Arg	Thr	Ile
Val	Ile 210	Glu	Phe	Ala	Asp	Pro 215	Ala	Arg	Glu	Leu	Pro 220	Val	Leu	Thr	Ser

<210> 66

<211> 687

<212> DNA

<213> Micromonospora carbonacea

<220>

<221> CDS

<222> (1) .. (687)

<220>

<223> evrU

<400> 66

gtg	aat	gga	ttc	gag	cac	gac	gga	gtg	cgt	tac	gcc	gag	ggc	tcc	cag	48
Val	Asn	Gly	Phe	Glu	His	Asp	Gly	Val	Arg	Tyr	Ala	Glu	Gly	Ser	Gln	
1				5					10					15		
cac	ggt	tat	ctg	ctg	agc	cag	tcc	ccg	gcc	gac	cgg	gcc	gcg	aag	ttc	96
His	Gly	Tyr	Leu	Leu	Ser	Gln	Ser	Pro	Ala	Asp	Arg	Ala	Ala	Lys	Phe	
			20					25					30			
ttc	ggt	gcg	ttt	ccc	gac	gcg	cgg	cgg	atc	ctc	gaa	ctc	ggc	gca	ctg	144
Phe	Gly	Ala	Phe	Pro	Asp	Ala	Arg	Arg	Ile	Leu	Glu	Leu	Gly	Ala	Leu	
		35					40					45				
gag	ggc	gcg	gac	acg	ctt	gcc	ctc	gcc	cgg	cac	ccc	ggc	acg	acg	gtg	192
Glu	Gly	Ala	Asp	Thr	Leu	Ala	Leu	Ala	Arg	His	Pro	Gly	Thr	Thr	Val	
	50					55					60					
ctt	gcc	ctg	gag	ggc	cgt	ccg	gag	aac	ctg	cgc	cgc	gcg	gag	ctg	gtg	240
Leu	Ala	Leu	Glu	Gly	Arg	Pro	Glu	Asn	Leu	Arg	Arg	Ala	Glu	Leu	Val	

65	70	75	80	
atg gag gtc aac ggc atc acc aac gtg gag ctg cgc gtc gcc gac gtg				288
Met Glu Val Asn Gly Ile Thr Asn Val Glu Leu Arg Val Ala Asp Val	85	90	95	
gag cgg atc gac ttc acc gag ctg ggc gag ttc gac gcc gtc ctc tgc				336
Glu Arg Ile Asp Phe Thr Glu Leu Gly Glu Phe Asp Ala Val Leu Cys	100	105	110	
gcg ggc ctg ctc tac cac gtg cgt gag ccg tgg acc ctg ctg aag gac				384
Ala Gly Leu Leu Tyr His Val Arg Glu Pro Trp Thr Leu Lys Asp	115	120	125	
atc gcg ggc gtc gcg gcg gga atc tac ctc tcc acc cac tac tgg gga				432
Ile Ala Gly Val Ala Ala Gly Ile Tyr Leu Ser Thr His Tyr Trp Gly	130	135	140	
ggc gtg ggc gac ctg caa ccg atc gac ggc tac acg gtc aag cag gtc				480
Gly Val Gly Asp Leu Gln Pro Ile Asp Gly Tyr Thr Val Lys Gln Val	145	150	155	160
cgc gag gag cac ccc gag ccg cag gcc ccg ggg ctc agc gtc gac gtg				528
Arg Glu Glu His Pro Glu Pro Gln Ala Arg Gly Leu Ser Val Asp Val	165	170	175	
cgc tgg ctc gac ccg gag tcc ctg ttc gcc gcc ctg cac aac gcc ggc				576
Arg Trp Leu Asp Arg Glu Ser Leu Phe Ala Ala Leu His Asn Ala Gly	180	185	190	
ttc gcc gag gtg gag gtg ctg cac gag cgc ccg tcc ccg gag gtg tgc				624
Phe Ala Glu Val Glu Val Leu His Glu Arg Arg Ser Pro Glu Val Cys	195	200	205	
gac atc atc gcc gtc ggc cgc cgc acc ggc acg cgc cga ccg acc gaa				672
Asp Ile Ile Ala Val Gly Arg Arg Thr Gly Thr Arg Arg Pro Thr Glu	210	215	220	
ggg gtg agc ctc cga				687
Gly Val Ser Leu Arg				
225				

<210> 67

<211> 229

<212> PRT

<213> Micromonospora carbonacea

<220>

<223> evrU

<400> 67

Val Asn Gly Phe Glu His Asp Gly Val Arg Tyr Ala Glu Gly Ser Gln
1 5 10 15

His Gly Tyr Leu Leu Ser Gln Ser Pro Ala Asp Arg Ala Ala Lys Phe
20 25 30

Phe Gly Ala Phe Pro Asp Ala Arg Arg Ile Leu Glu Leu Gly Ala Leu
35 40 45

Glu Gly Ala Asp Thr Leu Ala Leu Ala Arg His Pro Gly Thr Thr Val
50 55 60

Leu Ala Leu Glu Gly Arg Pro Glu Asn Leu Arg Arg Ala Glu Leu Val

65		70		75		80									
Met	Glu	Val	Asn	Gly	Ile	Thr	Asn	Val	Glu	Leu	Arg	Val	Ala	Asp	Val
				85					90					95	
Glu	Arg	Ile	Asp	Phe	Thr	Glu	Leu	Gly	Glu	Phe	Asp	Ala	Val	Leu	Cys
			100					105					110		
Ala	Gly	Leu	Leu	Tyr	His	Val	Arg	Glu	Pro	Trp	Thr	Leu	Leu	Lys	Asp
		115					120					125			
Ile	Ala	Gly	Val	Ala	Ala	Gly	Ile	Tyr	Leu	Ser	Thr	His	Tyr	Trp	Gly
	130					135					140				
Gly	Val	Gly	Asp	Leu	Gln	Pro	Ile	Asp	Gly	Tyr	Thr	Val	Lys	Gln	Val
145					150					155				160	
Arg	Glu	Glu	His	Pro	Glu	Pro	Gln	Ala	Arg	Gly	Leu	Ser	Val	Asp	Val
				165					170					175	
Arg	Trp	Leu	Asp	Arg	Glu	Ser	Leu	Phe	Ala	Ala	Leu	His	Asn	Ala	Gly
			180					185					190		
Phe	Ala	Glu	Val	Glu	Val	Leu	His	Glu	Arg	Arg	Ser	Pro	Glu	Val	Cys
		195					200					205			
Asp	Ile	Ile	Ala	Val	Gly	Arg	Arg	Thr	Gly	Thr	Arg	Arg	Pro	Thr	Glu
	210					215					220				
Gly	Val	Ser	Leu	Arg											
225															

<210> 68
 <211> 1026
 <212> DNA
 <213> Micromonospora carbonacea

<220>
 <221> CDS
 <222> (1) .. (1026)

<220>
 <223> evrV

<400> 68																
atg	gtt	cgt	tgt	ctg	gtg	act	ggg	ggg	gcc	gga	ttc	atc	ggc	tcg	cac	48
Met	Val	Arg	Cys	Leu	Val	Thr	Gly	Gly	Ala	Gly	Phe	Ile	Gly	Ser	His	
1				5					10					15		
ctg gtc gag tca ttg gtc agg aat ggg cac cgg gtc acc gtt ctg gac																96
Leu	Val	Glu	Ser	Leu	Val	Arg	Asn	Gly	His	Arg	Val	Thr	Val	Leu	Asp	
			20					25					30			
gac ctc agc ggc ggc agc cgg cag cgg gtt ccg gcc ggg gtg gac ctg																144
Asp	Leu	Ser	Gly	Gly	Ser	Arg	Gln	Arg	Val	Pro	Ala	Gly	Val	Asp	Leu	
		35					40					45				
gcc gtc ggt tcg gtg acc gac gtg gac ttc gtc gat tca ctg ttc gcc																192
Ala	Val	Gly	Ser	Val	Thr	Asp	Val	Asp	Phe	Val	Asp	Ser	Leu	Phe	Ala	
		50				55					60					
gag aac cga ttc gag cgg gtc ttc cac ttt gcc gcc ttc gcg gcg gag																240
Glu	Asn	Arg	Phe	Glu	Arg	Val	Phe	His	Phe	Ala	Ala	Phe	Ala	Ala	Glu	

65	70					75					80					
gcg atc agc cat tcg gtg aag cag ctc aac tac gcc acc aat gtg atg	Ala Ile Ser His Ser Val Lys Gln Leu Asn Tyr Gly Thr Asn Val Met					85 90 95										288
ggc agc ata aat ctg atc aac gcg tcg ctg cgt acc gcc gtg cgg ttc	Gly Ser Ile Asn Leu Ile Asn Ala Ser Leu Arg Thr Gly Val Arg Phe					100 105 110										336
ttc tgt ttc gcc tcc tcc gtg gcg gtc tac gcc cac gcc gag acg ccg	Phe Cys Phe Ala Ser Ser Val Ala Val Tyr Gly His Gly Glu Thr Pro					115 120 125										384
atg cgc gag tcc gtc gtc ccc gtc ccc gcg gac agc tac gcc ctg gcc	Met Arg Glu Ser Val Val Pro Val Pro Ala Asp Ser Tyr Gly Leu Ala					130 135 140										432
aag tac ctg gtc gag cgc gag ctg gag gtg acg atg cgg acc cag ggg	Lys Tyr Leu Val Glu Arg Glu Leu Glu Val Thr Met Arg Thr Gln Gly					145 150 155 160										480
ctg ccc ttc acc gcc ttc cgc atg cac aac gtc tac gcc gag tgg cag	Leu Pro Phe Thr Ala Phe Arg Met His Asn Val Tyr Gly Glu Trp Gln					165 170 175										528
aac atg cgg gac ccg tac cgc aac gcg gtc gcc atc ttc ttc aac cag	Asn Met Arg Asp Pro Tyr Arg Asn Ala Val Ala Ile Phe Phe Asn Gln					180 185 190										576
atc ctg cga gcc gag ccg atc acc gtg tac gcc gac gcc gcc cag gtc	Ile Leu Arg Gly Glu Pro Ile Thr Val Tyr Gly Asp Gly Gly Gln Val					195 200 205										624
cgc gcg ttc acg tac gtc ggt gac gtg gtg aac gtg gtc agc cgc gcc	Arg Ala Phe Thr Tyr Val Gly Asp Val Val Asn Val Val Ser Arg Ala					210 215 220										672
gcc gag acc gag gcc gcg tgg ggg cgg gca ttc aac gtg gcc tcg tcg	Ala Glu Thr Glu Ala Ala Trp Gly Arg Ala Phe Asn Val Gly Ser Ser					225 230 235 240										720
agc acc aac acc gtg ctg gag ctg gcc cag gcg gta cgg tcg gcg gcc	Ser Thr Asn Thr Val Leu Glu Leu Ala Gln Ala Val Arg Ser Ala Ala					245 250 255										768
ggc gtg ccg gag cat ccg atc gcc cac ctg ccg tcg cgg gac gag gtg	Gly Val Pro Glu His Pro Ile Ala His Leu Pro Ser Arg Asp Glu Val					260 265 270										816
cga acc gcg tac acc gcg acg gag ctg gcc cga tcg gtc ttc gcc gac	Arg Thr Ala Tyr Thr Ala Thr Glu Leu Ala Arg Ser Val Phe Gly Asp					275 280 285										864
tgg acg gac acc ccg ctg gcc gag gga ctg gcc cgc acc gcc agg tgg	Trp Thr Asp Thr Pro Leu Ala Glu Gly Leu Ala Arg Thr Ala Arg Trp					290 295 300										912
gcg gcc gac gcc ggg ccg gcg gaa ctc cag tcg tcc ttc gat atc gag	Ala Ala Asp Ala Gly Pro Ala Glu Leu Gln Ser Ser Phe Asp Ile Glu					305 310 315 320										960
atc ggc ggg gac cgg att ccg gaa tgg gcc cgg ctg gtc aac gaa agg	Ile Gly Gly Asp Arg Ile Pro Glu Trp Ala Arg Leu Val Asn Glu Arg					325 330 335										1008

ctc agc acg gcg agc cgc
 Leu Ser Thr Ala Ser Arg
 340

1026

<210> 69
 <211> 342
 <212> PRT
 <213> Micromonospora carbonacea

<220>
 <223> evrV

<400> 69
 Met Val Arg Cys Leu Val Thr Gly Gly Ala Gly Phe Ile Gly Ser His
 1 5 10 15
 Leu Val Glu Ser Leu Val Arg Asn Gly His Arg Val Thr Val Leu Asp
 20 25 30
 Asp Leu Ser Gly Gly Ser Arg Gln Arg Val Pro Ala Gly Val Asp Leu
 35 40 45
 Ala Val Gly Ser Val Thr Asp Val Asp Phe Val Asp Ser Leu Phe Ala
 50 55 60
 Glu Asn Arg Phe Glu Arg Val Phe His Phe Ala Ala Phe Ala Ala Glu
 65 70 75 80
 Ala Ile Ser His Ser Val Lys Gln Leu Asn Tyr Gly Thr Asn Val Met
 85 90 95
 Gly Ser Ile Asn Leu Ile Asn Ala Ser Leu Arg Thr Gly Val Arg Phe
 100 105 110
 Phe Cys Phe Ala Ser Ser Val Ala Val Tyr Gly His Gly Glu Thr Pro
 115 120 125
 Met Arg Glu Ser Val Val Pro Val Pro Ala Asp Ser Tyr Gly Leu Ala
 130 135 140
 Lys Tyr Leu Val Glu Arg Glu Leu Glu Val Thr Met Arg Thr Gln Gly
 145 150 155 160
 Leu Pro Phe Thr Ala Phe Arg Met His Asn Val Tyr Gly Glu Trp Gln
 165 170 175
 Asn Met Arg Asp Pro Tyr Arg Asn Ala Val Ala Ile Phe Phe Asn Gln
 180 185 190
 Ile Leu Arg Gly Glu Pro Ile Thr Val Tyr Gly Asp Gly Gly Gln Val
 195 200 205
 Arg Ala Phe Thr Tyr Val Gly Asp Val Val Asn Val Val Ser Arg Ala
 210 215 220
 Ala Glu Thr Glu Ala Ala Trp Gly Arg Ala Phe Asn Val Gly Ser Ser
 225 230 235 240
 Ser Thr Asn Thr Val Leu Glu Leu Ala Gln Ala Val Arg Ser Ala Ala
 245 250 255
 Gly Val Pro Glu His Pro Ile Ala His Leu Pro Ser Arg Asp Glu Val
 260 265 270

Arg Thr Ala Tyr Thr Ala Thr Glu Leu Ala Arg Ser Val Phe Gly Asp
 275 280 285

Trp Thr Asp Thr Pro Leu Ala Glu Gly Leu Ala Arg Thr Ala Arg Trp
 290 295 300

Ala Ala Asp Ala Gly Pro Ala Glu Leu Gln Ser Ser Phe Asp Ile Glu
 305 310 315 320

Ile Gly Gly Asp Arg Ile Pro Glu Trp Ala Arg Leu Val Asn Glu Arg
 325 330 335

Leu Ser Thr Ala Ser Arg
 340

<210> 70
 <211> 987
 <212> DNA
 <213> Micromonospora carbonacea

<220>
 <221> CDS
 <222> (1)..(987)

<220>
 <223> evrW

<400> 70
 atg cgt cgc gtc ctg gtc acc ggc ggt gcc ggt ttc atc ggc tcg cag 48
 Met Arg Arg Val Leu Val Thr Gly Gly Ala Gly Phe Ile Gly Ser Gln
 1 5 10 15

tac gtc cgc gac ctg gcc acc ggt gcc tac ccc gac acg gcg cag gcc 96
 Tyr Val Arg Asp Leu Ala Thr Gly Ala Tyr Pro Asp Thr Ala Gln Ala
 20 25 30

cgg gtg acg gtg ctg gac aag ctg acg tac gcg ggc aac ctc gcc aac 144
 Arg Val Thr Val Leu Asp Lys Leu Thr Tyr Ala Gly Asn Leu Ala Asn
 35 40 45

ctc gaa ccg gtc cag gac cgg atc acc ttc gtc cag ggc gac gtc tgc 192
 Leu Glu Pro Val Gln Asp Arg Ile Thr Phe Val Gln Gly Asp Val Cys
 50 55 60

gac acg gcg ctg ctg gcc gag gtg ctg ccc ggg cac gac gtg gtg gtc 240
 Asp Thr Ala Leu Leu Ala Glu Val Leu Pro Gly His Asp Val Val Val
 65 70 75 80

aac ttc gcc gcc gag tcg cac gtc gac cgg tcc atc gcc gac tcg gcg 288
 Asn Phe Ala Ala Glu Ser His Val Asp Arg Ser Ile Ala Asp Ser Ala
 85 90 95

gag ttc gtc cgc acc aac gtg cag ggc gtc cag acg ctc atg cag gcg 336
 Glu Phe Val Arg Thr Asn Val Gln Gly Val Gln Thr Leu Met Gln Ala
 100 105 110

tgt ctc gac gcc ggg gtc gcc cgg gtg gtc cag gtc tcc acc gac gag 384
 Cys Leu Asp Ala Gly Val Ala Arg Val Val Gln Val Ser Thr Asp Glu
 115 120 125

gtc tac ggc agc atc gac gag ggt tcc tgg gcc gag gac acc ccc ctg 432
 Val Tyr Gly Ser Ile Asp Glu Gly Ser Trp Ala Glu Asp Thr Pro Leu

130	135	140	
gcg ccg aac tcc ccg tac Ala Pro Asn Ser Pro Tyr 145	gcg ccg gcg aag gcc ggc ggg gac ctg atc Ala Ala Ala Lys Ala Gly Gly Asp Leu Ile 150 155 160		480
gcc ctg gcc tac gcc cgc acc cac ggg ctg ccg gtc tgc ctc acc cgg Ala Leu Ala Tyr Ala Arg Thr His Gly Leu Pro Val Cys Leu Thr Arg 165 170 175			528
tgc ggc aac aac tac ggg ccg tac cag ttt ccg gag aag ctg atc ccg Cys Gly Asn Asn Tyr Gly Pro Tyr Gln Phe Pro Glu Lys Leu Ile Pro 180 185 190			576
ctg ttc gtc acc gag ctg ttg aac ggg cga ccg gtg ccg ctg tac ggc Leu Phe Val Thr Glu Leu Leu Asn Gly Arg Arg Val Pro Leu Tyr Gly 195 200 205			624
gac ggc ggc aac gtc cgc gac tgg atc cac gtg acg gac cac tgc cgg Asp Gly Gly Asn Val Arg Asp Trp Ile His Val Thr Asp His Cys Arg 210 215 220			672
ggc atc cag acc gtc gtc gac cgc ggt gtc ccc ggc gag gtc tac cac Gly Ile Gln Thr Val Val Asp Arg Gly Val Pro Gly Glu Val Tyr His 225 230 235 240			720
atc gcc ggc acg gct gag ctg tcc aac atg gag ctg acc ggg cgg ctg Ile Ala Gly Thr Ala Glu Leu Ser Asn Met Glu Leu Thr Gly Arg Leu 245 250 255			768
ctg gac gcc ttg ggg gcc ggg tgg gac cgg gtc gag cgg gtg ccg gac Leu Asp Ala Leu Gly Ala Gly Trp Asp Arg Val Glu Arg Val Pro Asp 260 265 270			816
cgc aag ggc cac gac cgc cgc tac tcg ctg acg gac gcg aaa ctg cgg Arg Lys Gly His Asp Arg Arg Tyr Ser Leu Thr Asp Ala Lys Leu Arg 275 280 285			864
gcg ctc ggc tac cgg ccc gag gtc gcc ttc gcc gac ggc ctg gcc gag Ala Leu Gly Tyr Arg Pro Glu Val Ala Phe Ala Asp Gly Leu Ala Glu 290 295 300			912
acg atc gac tgg tac cgg acg cac cgg gac tgg tgg gag ccg ctg aag Thr Ile Asp Trp Tyr Arg Thr His Arg Asp Trp Trp Glu Pro Leu Lys 305 310 315 320			960
aag cag gcc gac cgg tcg ccg gtg ccc Lys Gln Ala Asp Arg Ser Pro Val Pro 325			987

<210> 71

<211> 329

<212> PRT

<213> Micromonospora carbonacea

<220>

<223> evrW

<400> 71

Met	Arg	Arg	Val	Leu	Val	Thr	Gly	Gly	Ala	Gly	Phe	Ile	Gly	Ser	Gln
1				5					10					15	

Tyr	Val	Arg	Asp	Leu	Ala	Thr	Gly	Ala	Tyr	Pro	Asp	Thr	Ala	Gln	Ala
			20					25					30		

Arg Val Thr Val Leu Asp Lys Leu Thr Tyr Ala Gly Asn Leu Ala Asn
 35 40 45
 Leu Glu Pro Val Gln Asp Arg Ile Thr Phe Val Gln Gly Asp Val Cys
 50 55 60
 Asp Thr Ala Leu Leu Ala Glu Val Leu Pro Gly His Asp Val Val Val
 65 70 75 80
 Asn Phe Ala Ala Glu Ser His Val Asp Arg Ser Ile Ala Asp Ser Ala
 85 90 95
 Glu Phe Val Arg Thr Asn Val Gln Gly Val Gln Thr Leu Met Gln Ala
 100 105 110
 Cys Leu Asp Ala Gly Val Ala Arg Val Val Gln Val Ser Thr Asp Glu
 115 120 125
 Val Tyr Gly Ser Ile Asp Glu Gly Ser Trp Ala Glu Asp Thr Pro Leu
 130 135 140
 Ala Pro Asn Ser Pro Tyr Ala Ala Ala Lys Ala Gly Gly Asp Leu Ile
 145 150 155 160
 Ala Leu Ala Tyr Ala Arg Thr His Gly Leu Pro Val Cys Leu Thr Arg
 165 170 175
 Cys Gly Asn Asn Tyr Gly Pro Tyr Gln Phe Pro Glu Lys Leu Ile Pro
 180 185 190
 Leu Phe Val Thr Glu Leu Leu Asn Gly Arg Arg Val Pro Leu Tyr Gly
 195 200 205
 Asp Gly Gly Asn Val Arg Asp Trp Ile His Val Thr Asp His Cys Arg
 210 215 220
 Gly Ile Gln Thr Val Val Asp Arg Gly Val Pro Gly Glu Val Tyr His
 225 230 235 240
 Ile Ala Gly Thr Ala Glu Leu Ser Asn Met Glu Leu Thr Gly Arg Leu
 245 250 255
 Leu Asp Ala Leu Gly Ala Gly Trp Asp Arg Val Glu Arg Val Pro Asp
 260 265 270
 Arg Lys Gly His Asp Arg Arg Tyr Ser Leu Thr Asp Ala Lys Leu Arg
 275 280 285
 Ala Leu Gly Tyr Arg Pro Glu Val Ala Phe Ala Asp Gly Leu Ala Glu
 290 295 300
 Thr Ile Asp Trp Tyr Arg Thr His Arg Asp Trp Trp Glu Pro Leu Lys
 305 310 315 320
 Lys Gln Ala Asp Arg Ser Pro Val Pro
 325

<210> 72

<211> 1065

<212> DNA

<213> Micromonospora carbonacea

<220>
 <221> CDS
 <222> (1)..(1065)

<220>
 <223> evrX

<400> 72

gtg aag gcg ctg gtc ctg gcg gga ggg gtg gga tcg aga ttg cgt ccg	48
Val Lys Ala Leu Val Leu Ala Gly Gly Val Gly Ser Arg Leu Arg Pro	
1 5 10 15	
atc acc cac acg tcc gcc aaa caa ctc att ccc gtg gcc aac aag ccg	96
Ile Thr His Thr Ser Ala Lys Gln Leu Ile Pro Val Ala Asn Lys Pro	
20 25 30	
gtg ctg ttc tac ggg ctc gag gct att cgt gag gcc ggt atc gag gag	144
Val Leu Phe Tyr Gly Leu Glu Ala Ile Arg Glu Gly Gly Ile Glu Glu	
35 40 45	
gtg ggc atc gtc gtc ggc agc acc gcg ccc gaa att cag cgc gtg gtc	192
Val Gly Ile Val Val Gly Ser Thr Ala Pro Glu Ile Gln Arg Val Val	
50 55 60	
ggc gat ggt tcc cag ttc ggc ctc cag gtg acc tac ctt ccg cag gag	240
Gly Asp Gly Ser Gln Phe Gly Leu Gln Val Thr Tyr Leu Pro Gln Glu	
65 70 75 80	
gct ccc cgg ggg ctg gcg cac gcc gtg ctc atc tcc cgc gac tac ctc	288
Ala Pro Arg Gly Leu Ala His Ala Val Leu Ile Ser Arg Asp Tyr Leu	
85 90 95	
ggc gac gac gac ttc gtc atg tac ctc ggc gac aac ttc atc gtc ggc	336
Gly Asp Asp Asp Phe Val Met Tyr Leu Gly Asp Asn Phe Ile Val Gly	
100 105 110	
ggg atc aag gac atc gtc gag cgc ttc cgg cag gag cga ccg cac gcg	384
Gly Ile Lys Asp Ile Val Glu Arg Phe Arg Gln Glu Arg Pro His Ala	
115 120 125	
cag atc atg ctg acc cgg gtc gcc gac ccg cac gcc ttc ggc gtc gcc	432
Gln Ile Met Leu Thr Arg Val Ala Asp Pro His Ala Phe Gly Val Ala	
130 135 140	
gag atg ggc gcg gac ggc cgg gtg atc ggg gtg gag gag aag ccc gag	480
Glu Met Gly Ala Asp Gly Arg Val Ile Gly Val Glu Glu Lys Pro Glu	
145 150 155 160	
cac ccc aag agc gac ctg gcc ctg gtc ggg gtc tac gtc ttc agc ccg	528
His Pro Lys Ser Asp Leu Ala Leu Val Gly Val Tyr Val Phe Ser Pro	
165 170 175	
gtg gtc cac gat gcc gtg gcc gag ctg aag ccg tcc tgg cgc aac gag	576
Val Val His Asp Ala Val Ala Glu Leu Lys Pro Ser Trp Arg Asn Glu	
180 185 190	
ctg gag atc acc gac gcg gtg cag tgg atg atc gac cgc ggc cac ccg	624
Leu Glu Ile Thr Asp Ala Val Gln Trp Met Ile Asp Arg Gly His Arg	
195 200 205	
gtc gac tcc acc atg atc acg ggc tac tgg aag gac acc ggc aac ctc	672
Val Asp Ser Thr Met Ile Thr Gly Tyr Trp Lys Asp Thr Gly Asn Leu	
210 215 220	
gcc gac atg ctg gag atg aac cgg ttc gtc ctc gcc agc gtc gag cct	720

Ala	Asp	Met	Leu	Glu	Met	Asn	Arg	Phe	Val	Leu	Gly	Ser	Val	Glu	Pro	
225					230					235					240	
ttg	gtc	gag	ggc	aag	gtc	gac	gac	cgc	acc	gaa	ctg	atc	ggc	ccg	gtg	768
Leu	Val	Glu	Gly	Lys	Val	Asp	Asp	Arg	Thr	Glu	Leu	Ile	Gly	Pro	Val	
				245					250					255		
gtg	atc	agc	gcc	ggc	gcc	gac	gtc	agc	ggc	tcc	cgg	atc	gtc	ggc	ccg	816
Val	Ile	Ser	Ala	Gly	Ala	Asp	Val	Ser	Gly	Ser	Arg	Ile	Val	Gly	Pro	
			260					265					270			
gtg	gtg	gtc	gga	gcc	ggc	tcg	atc	atc	cgc	aac	tcc	tac	ctc	ggc	ccg	864
Val	Val	Val	Gly	Ala	Gly	Ser	Ile	Ile	Arg	Asn	Ser	Tyr	Leu	Gly	Pro	
			275				280					285				
tac	acc	tcg	atc	gac	tgc	gac	tgc	acc	ctg	ctg	gag	acc	gag	atc	gag	912
Tyr	Thr	Ser	Ile	Asp	Cys	Asp	Cys	Thr	Leu	Leu	Glu	Thr	Glu	Ile	Glu	
	290					295					300					
cac	tcc	atc	gtg	ctg	cgc	ggc	gcc	tac	atc	gag	ggc	atc	ggc	cgc	atc	960
His	Ser	Ile	Val	Leu	Arg	Gly	Ala	Tyr	Ile	Glu	Gly	Ile	Gly	Arg	Ile	
305					310					315					320	
gag	ttc	tcg	atg	atc	ggc	cgg	gag	gcg	cgg	gtg	gtc	ccc	ggg	ccc	cgg	1008
Glu	Phe	Ser	Met	Ile	Gly	Arg	Glu	Ala	Arg	Val	Val	Pro	Gly	Pro	Arg	
				325					330					335		
gtg	ccc	aag	acg	cac	cgg	ttc	gtc	ctc	ggc	gat	cac	agc	gaa	gtc	cgg	1056
Val	Pro	Lys	Thr	His	Arg	Phe	Val	Leu	Gly	Asp	His	Ser	Glu	Val	Arg	
			340					345					350			
gtg	ggg	gtc														1065
Val	Gly	Val														
		355														

<210> 73
 <211> 355
 <212> PRT
 <213> Micromonospora carbonacea

 <220>
 <223> evrX

 <400> 73
 Val Lys Ala Leu Val Leu Ala Gly Gly Val Gly Ser Arg Leu Arg Pro
 1 5 10 15
 Ile Thr His Thr Ser Ala Lys Gln Leu Ile Pro Val Ala Asn Lys Pro
 20 25 30
 Val Leu Phe Tyr Gly Leu Glu Ala Ile Arg Glu Gly Gly Ile Glu Glu
 35 40 45
 Val Gly Ile Val Val Gly Ser Thr Ala Pro Glu Ile Gln Arg Val Val
 50 55 60
 Gly Asp Gly Ser Gln Phe Gly Leu Gln Val Thr Tyr Leu Pro Gln Glu
 65 70 75 80
 Ala Pro Arg Gly Leu Ala His Ala Val Leu Ile Ser Arg Asp Tyr Leu
 85 90 95
 Gly Asp Asp Asp Phe Val Met Tyr Leu Gly Asp Asn Phe Ile Val Gly
 100 105 110

Gly Ile Lys Asp Ile Val Glu Arg Phe Arg Gln Glu Arg Pro His Ala
 115 120 125
 Gln Ile Met Leu Thr Arg Val Ala Asp Pro His Ala Phe Gly Val Ala
 130 135 140
 Glu Met Gly Ala Asp Gly Arg Val Ile Gly Val Glu Glu Lys Pro Glu
 145 150 155 160
 His Pro Lys Ser Asp Leu Ala Leu Val Gly Val Tyr Val Phe Ser Pro
 165 170 175
 Val Val His Asp Ala Val Ala Glu Leu Lys Pro Ser Trp Arg Asn Glu
 180 185 190
 Leu Glu Ile Thr Asp Ala Val Gln Trp Met Ile Asp Arg Gly His Arg
 195 200 205
 Val Asp Ser Thr Met Ile Thr Gly Tyr Trp Lys Asp Thr Gly Asn Leu
 210 215 220
 Ala Asp Met Leu Glu Met Asn Arg Phe Val Leu Gly Ser Val Glu Pro
 225 230 235 240
 Leu Val Glu Gly Lys Val Asp Asp Arg Thr Glu Leu Ile Gly Pro Val
 245 250 255
 Val Ile Ser Ala Gly Ala Asp Val Ser Gly Ser Arg Ile Val Gly Pro
 260 265 270
 Val Val Val Gly Ala Gly Ser Ile Ile Arg Asn Ser Tyr Leu Gly Pro
 275 280 285
 Tyr Thr Ser Ile Asp Cys Asp Cys Thr Leu Leu Glu Thr Glu Ile Glu
 290 295 300
 His Ser Ile Val Leu Arg Gly Ala Tyr Ile Glu Gly Ile Gly Arg Ile
 305 310 315 320
 Glu Phe Ser Met Ile Gly Arg Glu Ala Arg Val Val Pro Gly Pro Arg
 325 330 335
 Val Pro Lys Thr His Arg Phe Val Leu Gly Asp His Ser Glu Val Arg
 340 345 350
 Val Gly Val
 355

<210> 74
 <211> 744
 <212> DNA
 <213> Micromonospora carbonacea

<220>
 <221> CDS
 <222> (1) .. (744)

<220>
 <223> evrY

<400> 74
 atg acg acc ccc ctg ccc cgt ccg atc gac gcc gtc ctg ttc gac ttc 48

Met	Thr	Thr	Pro	Leu	Pro	Arg	Pro	Ile	Asp	Ala	Val	Leu	Phe	Asp	Phe	
1				5					10					15		
tcc	ggc	acg	ctg	ttc	gcc	gtg	gaa	ctg	ccg	cag	cgt	tgg	ctg	cgg	gcg	96
Ser	Gly	Thr	Leu	Phe	Ala	Val	Glu	Leu	Pro	Gln	Arg	Trp	Leu	Arg	Ala	
			20					25					30			
gcg	gcg	gcc	acc	gtc	ggc	gtc	cag	ctc	gac	ccg	gcg	cag	cag	gag	gcc	144
Ala	Ala	Ala	Thr	Val	Gly	Val	Gln	Leu	Asp	Pro	Ala	Gln	Gln	Glu	Ala	
			35				40					45				
ctg	acc	ggg	ttg	ctg	ctg	gcg	gcc	ggc	cgt	ccc	ggc	ggg	ccg	gag	ccg	192
Leu	Thr	Gly	Leu	Leu	Leu	Ala	Ala	Gly	Arg	Pro	Gly	Gly	Pro	Glu	Pro	
	50					55					60					
cac	gcc	gtc	ccg	ccg	ggg	ctc	gcc	gag	gtg	tac	gcc	cgc	cgg	gac	ctc	240
His	Ala	Val	Pro	Pro	Gly	Leu	Ala	Glu	Val	Tyr	Ala	Arg	Arg	Asp	Leu	
65					70					75					80	
tcg	ccc	gaa	acg	cac	cgc	agc	gcg	tac	gtg	ggc	ctg	ctc	tcc	acc	gtc	288
Ser	Pro	Glu	Thr	His	Arg	Ser	Ala	Tyr	Val	Gly	Leu	Leu	Ser	Thr	Val	
				85					90					95		
gac	ctg	ccc	cat	ccc	ggc	ctc	gcc	gag	gcg	ctc	tac	gac	cgg	ctg	ttc	336
Asp	Leu	Pro	His	Pro	Gly	Leu	Ala	Glu	Ala	Leu	Tyr	Asp	Arg	Leu	Phe	
			100					105					110			
cgc	acg	gac	ggc	tgg	ctg	ccc	tac	cgc	gac	gcc	gcc	ccg	gtc	ctg	gcg	384
Arg	Thr	Asp	Gly	Trp	Leu	Pro	Tyr	Arg	Asp	Ala	Ala	Pro	Val	Leu	Ala	
			115				120					125				
gag	ttg	cgc	cgg	cgc	ggc	gtg	ggc	acc	gcc	gtg	gtc	agc	aac	atc	gcc	432
Glu	Leu	Arg	Arg	Arg	Gly	Val	Gly	Thr	Ala	Val	Val	Ser	Asn	Ile	Ala	
	130					135					140					
tgg	gac	ctg	cgg	ccc	acc	ttc	gcg	gcg	tac	ggg	atg	gcg	gag	ctg	gtg	480
Trp	Asp	Leu	Arg	Pro	Thr	Phe	Ala	Ala	Tyr	Gly	Met	Ala	Glu	Leu	Val	
145					150					155					160	
gac	gcc	tac	gtc	ttc	tcc	cac	gag	gtg	ggg	gcg	gtc	aag	ccc	gat	ccc	528
Asp	Ala	Tyr	Val	Phe	Ser	His	Glu	Val	Gly	Ala	Val	Lys	Pro	Asp	Pro	
				165					170					175		
cgg	atc	ttc	cgc	acc	gcc	tgc	gac	gag	ctg	aag	gtc	gcc	ccg	gag	cgg	576
Arg	Ile	Phe	Arg	Thr	Ala	Cys	Asp	Glu	Leu	Lys	Val	Ala	Pro	Glu	Arg	
			180					185					190			
gcg	ctg	atg	gtg	ggc	gac	acc	ctg	gcc	gac	ggg	ggg	gcg	gtg	tac	gcc	624
Ala	Leu	Met	Val	Gly	Asp	Thr	Leu	Ala	Asp	Gly	Gly	Ala	Val	Tyr	Ala	
			195				200					205				
ggc	ctg	cag	acc	ctg	ctg	ctg	ccg	gcc	agc	ccg	ccg	gac	acc	gtg	cac	672
Gly	Leu	Gln	Thr	Leu	Leu	Leu	Pro	Ala	Ser	Pro	Pro	Asp	Thr	Val	His	
	210					215					220					
ggc	ctg	gcc	gcc	gtg	ctc	gaa	ctg	gtc	ggc	ggc	ggg	ccg	gcc	agg	ccc	720
Gly	Leu	Ala	Ala	Val	Leu	Glu	Leu	Val	Gly	Gly	Gly	Pro	Ala	Arg	Pro	
225					230					235					240	
ccg	ttt	gcg	gaa	atg	gcg	gac	gca									744
Pro	Phe	Ala	Glu	Met	Ala	Asp	Ala									
				245												

<211> 248
 <212> PRT
 <213> Micromonospora carbonacea

<220>
 <223> evrY

<400> 75
 Met Thr Thr Pro Leu Pro Arg Pro Ile Asp Ala Val Leu Phe Asp Phe
 1 5 10 15
 Ser Gly Thr Leu Phe Ala Val Glu Leu Pro Gln Arg Trp Leu Arg Ala
 20 25 30
 Ala Ala Ala Thr Val Gly Val Gln Leu Asp Pro Ala Gln Gln Glu Ala
 35 40 45
 Leu Thr Gly Leu Leu Leu Ala Ala Gly Arg Pro Gly Gly Pro Glu Pro
 50 55 60
 His Ala Val Pro Pro Gly Leu Ala Glu Val Tyr Ala Arg Arg Asp Leu
 65 70 75 80
 Ser Pro Glu Thr His Arg Ser Ala Tyr Val Gly Leu Leu Ser Thr Val
 85 90 95
 Asp Leu Pro His Pro Gly Leu Ala Glu Ala Leu Tyr Asp Arg Leu Phe
 100 105 110
 Arg Thr Asp Gly Trp Leu Pro Tyr Arg Asp Ala Ala Pro Val Leu Ala
 115 120 125
 Glu Leu Arg Arg Arg Gly Val Gly Thr Ala Val Val Ser Asn Ile Ala
 130 135 140
 Trp Asp Leu Arg Pro Thr Phe Ala Ala Tyr Gly Met Ala Glu Leu Val
 145 150 155 160
 Asp Ala Tyr Val Phe Ser His Glu Val Gly Ala Val Lys Pro Asp Pro
 165 170 175
 Arg Ile Phe Arg Thr Ala Cys Asp Glu Leu Lys Val Ala Pro Glu Arg
 180 185 190
 Ala Leu Met Val Gly Asp Thr Leu Ala Asp Gly Gly Ala Val Tyr Ala
 195 200 205
 Gly Leu Gln Thr Leu Leu Leu Pro Ala Ser Pro Pro Asp Thr Val His
 210 215 220
 Gly Leu Ala Ala Val Leu Glu Leu Val Gly Gly Gly Pro Ala Arg Pro
 225 230 235 240
 Pro Phe Ala Glu Met Ala Asp Ala
 245

<210> 76
 <211> 750
 <212> DNA
 <213> Micromonospora carbonacea

<220>
 <221> CDS

<222> (1) .. (750)

<220>

<223> evrZ

<400> 76

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Val	Thr	Arg	Thr	Arg	Thr	Ala	Leu	Arg	Arg	Leu	Leu	Ala	Ala	Gly	Leu	
1				5					10					15		
gcc	agc	ctc	gcc	acc	gct	gcc	gcg	acc	ctc	gtc	gcc	acc	gcc	ggc	ccg	96
Ala	Ser	Leu	Ala	Thr	Ala	Ala	Ala	Thr	Leu	Val	Ala	Thr	Ala	Gly	Pro	
			20					25					30			
gcg	gcg	gcc	gcc	acc	acc	ccc	ggc	atc	gac	gtg	tcc	cac	tac	cag	gga	144
Ala	Ala	Ala	Ala	Thr	Thr	Pro	Gly	Ile	Asp	Val	Ser	His	Tyr	Gln	Gly	
		35					40					45				
tcg	atc	aac	tgg	acg	agc	gtc	cgc	aac	gcg	ggc	atc	cag	ttc	gcg	ttc	192
Ser	Ile	Asn	Trp	Thr	Ser	Val	Arg	Asn	Ala	Gly	Ile	Gln	Phe	Ala	Phe	
	50					55					60					
atc	aag	gcc	acc	gag	ggg	acg	agc	tac	aag	gac	ccc	aac	ttc	aac	gcc	240
Ile	Lys	Ala	Thr	Glu	Gly	Thr	Ser	Tyr	Lys	Asp	Pro	Asn	Phe	Asn	Ala	
	65				70					75					80	
aac	tac	gtc	aac	tcc	tac	aac	gcc	gga	gtg	atc	cgg	ggg	gcg	tac	cac	288
Asn	Tyr	Val	Asn	Ser	Tyr	Asn	Ala	Gly	Val	Ile	Arg	Gly	Ala	Tyr	His	
				85					90					95		
ttc	gcc	cgg	ccg	aac	atc	tcc	tcc	ggc	gcc	acc	cag	gcc	aac	tac	ctg	336
Phe	Ala	Arg	Pro	Asn	Ile	Ser	Ser	Gly	Ala	Thr	Gln	Ala	Asn	Tyr	Leu	
			100					105					110			
gcc	agc	aac	ggc	ggc	gcc	tgg	tcg	gcg	gac	agt	cgc	acc	ctg	ccg	gcc	384
Ala	Ser	Asn	Gly	Gly	Ala	Trp	Ser	Ala	Asp	Ser	Arg	Thr	Leu	Pro	Ala	
		115					120					125				
gcg	ctg	gac	gtc	gag	gcc	aac	ccg	tac	agc	ggc	ggc	acg	tgc	tac	ggc	432
Ala	Leu	Asp	Val	Glu	Ala	Asn	Pro	Tyr	Ser	Gly	Gly	Thr	Cys	Tyr	Gly	
	130					135					140					
ctc	agc	acg	tcc	ggg	atg	cgt	agc	tgg	atc	cag	gac	ttc	ctg	aac	acg	480
Leu	Ser	Thr	Ser	Gly	Met	Arg	Ser	Trp	Ile	Gln	Asp	Phe	Leu	Asn	Thr	
	145				150					155					160	
tac	aag	gcc	cgc	acc	ggc	cgg	tac	gcg	gtc	atc	tac	acc	acc	acg	agc	528
Tyr	Lys	Ala	Arg	Thr	Gly	Arg	Tyr	Ala	Val	Ile	Tyr	Thr	Thr	Thr	Ser	
				165					170					175		
tgg	tgg	aac	cag	tgc	acc	ggg	agc	tgg	acc	ggg	ccg	tgg	gcc	aac	cac	576
Trp	Trp	Asn	Gln	Cys	Thr	Gly	Ser	Trp	Thr	Gly	Pro	Trp	Ala	Asn	His	
			180				185						190			
ccg	ctg	tgg	ctc	gcc	cgc	tgg	tcg	agc	acc	ccg	ggc	acc	ctg	ccg	gcc	624
Pro	Leu	Trp	Leu	Ala	Arg	Trp	Ser	Ser	Thr	Pro	Gly	Thr	Leu	Pro	Ala	
		195					200					205				
ggc	gct	tcg	gtc	tgg	agc	ttc	tgg	cag	tac	acg	gcc	tcc	ggc	agc	gtc	672
Gly	Ala	Ser	Val	Trp	Ser	Phe	Trp	Gln	Tyr	Thr	Ala	Ser	Gly	Ser	Val	
	210					215					220					
tcc	ggg	atc	agc	ggc	aac	gtc	gac	cgc	aac	aac	tgg	aac	ggc	gac	cgc	720
Ser	Gly	Ile	Ser	Gly	Asn	Val	Asp	Arg	Asn	Asn	Trp	Asn	Gly	Asp	Arg	
	225				230					235					240	

acc cgg ctg atc gcg ctg gcg aac aac acc
 Thr Arg Leu Ile Ala Leu Ala Asn Asn Thr
 245 250

750

<210> 77
 <211> 250
 <212> PRT
 <213> Micromonospora carbonacea

<220>
 <223> evrZ

<400> 77
 Val Thr Arg Thr Arg Thr Ala Leu Arg Arg Leu Leu Ala Ala Gly Leu
 1 5 10 15
 Ala Ser Leu Ala Thr Ala Ala Ala Thr Leu Val Ala Thr Ala Gly Pro
 20 25 30
 Ala Ala Ala Ala Thr Thr Pro Gly Ile Asp Val Ser His Tyr Gln Gly
 35 40 45
 Ser Ile Asn Trp Thr Ser Val Arg Asn Ala Gly Ile Gln Phe Ala Phe
 50 55 60
 Ile Lys Ala Thr Glu Gly Thr Ser Tyr Lys Asp Pro Asn Phe Asn Ala
 65 70 75 80
 Asn Tyr Val Asn Ser Tyr Asn Ala Gly Val Ile Arg Gly Ala Tyr His
 85 90 95
 Phe Ala Arg Pro Asn Ile Ser Ser Gly Ala Thr Gln Ala Asn Tyr Leu
 100 105 110
 Ala Ser Asn Gly Gly Ala Trp Ser Ala Asp Ser Arg Thr Leu Pro Ala
 115 120 125
 Ala Leu Asp Val Glu Ala Asn Pro Tyr Ser Gly Gly Thr Cys Tyr Gly
 130 135 140
 Leu Ser Thr Ser Gly Met Arg Ser Trp Ile Gln Asp Phe Leu Asn Thr
 145 150 155 160
 Tyr Lys Ala Arg Thr Gly Arg Tyr Ala Val Ile Tyr Thr Thr Thr Ser
 165 170 175
 Trp Trp Asn Gln Cys Thr Gly Ser Trp Thr Gly Pro Trp Ala Asn His
 180 185 190
 Pro Leu Trp Leu Ala Arg Trp Ser Ser Thr Pro Gly Thr Leu Pro Ala
 195 200 205
 Gly Ala Ser Val Trp Ser Phe Trp Gln Tyr Thr Ala Ser Gly Ser Val
 210 215 220
 Ser Gly Ile Ser Gly Asn Val Asp Arg Asn Asn Trp Asn Gly Asp Arg
 225 230 235 240
 Thr Arg Leu Ile Ala Leu Ala Asn Asn Thr
 245 250

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<210> 78
<211> 2076
<212> DNA
<213> Micromonospora carbonacea
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<220>  
<221> CDS  
<222> (1)..(2076)
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<220>
<223> evsA

<400> 78																
atg	ggt	cgg	gta	tgg	aag	gcg	cgc	gac	gag	gtg	ctg	cac	cgg	gat	gtg	48
Met	Gly	Arg	Val	Trp	Lys	Ala	Arg	Asp	Glu	Val	Leu	His	Arg	Asp	Val	
1				5				10				15				
gcg	atc	aag	gaa	ctg	gtc	ccg	ccg	ccc	agc	ctc	acc	ccg	gag	gag	cgc	96
Ala	Ile	Lys	Glu	Leu	Val	Pro	Pro	Pro	Ser	Leu	Thr	Pro	Glu	Glu	Arg	
			20		25				30							
cgc	gag	atg	cgg	gaa	cgc	tcg	ctg	cgg	gag	gcc	cgt	gcc	atc	gcg	cga	144
Arg	Glu	Met	Arg	Glu	Arg	Ser	Leu	Arg	Glu	Ala	Arg	Ala	Ile	Ala	Arg	
		35		40				45								
ctc	aac	cac	gtc	aac	gtg	gtc	cgc	atc	ttc	gac	gtt	ctg	cgc	acc	gac	192
Leu	Asn	His	Val	Asn	Val	Val	Arg	Ile	Phe	Asp	Val	Leu	Arg	Thr	Asp	
		50		55				60								
ggc	gac	ccg	tgg	atc	gtc	atg	gag	tac	gtg	gcg	tcg	aag	tcc	ctt	cag	240
Gly	Asp	Pro	Trp	Ile	Val	Met	Glu	Tyr	Val	Ala	Ser	Lys	Ser	Leu	Gln	
65		70				75				80						
gac	act	ctc	gcg	gag	gac	ggg	ccg	gtg	tcg	ccg	gcc	aag	gcg	gtc	gag	288
Asp	Thr	Leu	Ala	Glu	Asp	Gly	Pro	Val	Ser	Pro	Ala	Lys	Ala	Val	Glu	
				85		90				95						
atc	ggc	ctg	ggg	gtg	ctc	ggc	gcg	ctg	aag	gcg	gcg	cac	aag	gcc	ggc	336
Ile	Gly	Leu	Gly	Val	Leu	Gly	Ala	Leu	Lys	Ala	Ala	His	Lys	Ala	Gly	
			100		105				110							
gtc	atg	cac	cgg	gac	atc	aag	ccg	ggc	aac	gtg	ctg	ctc	ggc	acc	gac	384
Val	Met	His	Arg	Asp	Ile	Lys	Pro	Gly	Asn	Val	Leu	Leu	Gly	Thr	Asp	
			115		120				125							
ggc	cgg	gtg	gtg	ctg	acc	gat	ttc	ggc	ctg	gcg	acc	atc	ccc	ggt	gac	432
Gly	Arg	Val	Val	Leu	Thr	Asp	Phe	Gly	Leu	Ala	Thr	Ile	Pro	Gly	Asp	
130		135				140										
ccg	aac	gtg	acg	cgg	acc	gga	atg	gtg	ctg	ggc	tcc	ccg	gcg	tac	atc	480
Pro	Asn	Val	Thr	Arg	Thr	Gly	Met	Val	Leu	Gly	Ser	Pro	Ala	Tyr	Ile	
145				150				155				160				
gcc	ccg	gag	cgg	gcg	cgg	gac	ggc	acc	gcc	ggc	ccg	gag	gcg	gac	ctc	528
Ala	Pro	Glu	Arg	Ala	Arg	Asp	Gly	Thr	Ala	Gly	Pro	Glu	Ala	Asp	Leu	
				165		170				175						
tgg	tcg	ctg	ggc	gcg	acg	ctc	tac	gcg	gcg	gtg	gag	ggc	aag	tcg	ccg	576
Trp	Ser	Leu	Gly	Ala	Thr	Leu	Tyr	Ala	Ala	Val	Glu	Gly	Lys	Ser	Pro	
			180		185				190							
ttc	gcc	cga	ccg	tcg	gcg	atc	gcc	acc	ctg	gcg	gcg	ctg	gcc	acc	gag	624
Phe	Ala	Arg	Pro	Ser	Ala	Ile	Ala	Thr	Leu	Ala	Ala	Leu	Ala	Thr	Glu	
		195		200				205								

ccg	atg	ccg	ccg	ccg	agg	aac	gcc	ggc	ccg	ttg	aag	ccg	gtg	ctg	aac	672
Pro	Met	Pro	Pro	Pro	Arg	Asn	Ala	Gly	Pro	Leu	Lys	Pro	Val	Leu	Asn	
210						215					220					
ggg	ctg	ctc	cgc	aag	gac	ccg	gcc	gag	cgg	atc	gac	gcc	gag	gtg	gcc	720
Gly	Leu	Leu	Arg	Lys	Asp	Pro	Ala	Glu	Arg	Ile	Asp	Ala	Glu	Val	Ala	
225					230					235					240	
gag	cgg	ctc	ctg	cgg	cgg	gcc	gcc	ggg	cgt	cgc	gcc	aag	acc	atc	tcg	768
Glu	Arg	Leu	Leu	Arg	Arg	Ala	Ala	Gly	Arg	Arg	Ala	Lys	Thr	Ile	Ser	
				245					250					255		
ctg	ctc	gac	ggc	gta	cgc	cgg	ccg	ggg	ccg	aac	ggc	ccg	cgc	gag	ccg	816
Leu	Leu	Asp	Gly	Val	Arg	Arg	Pro	Gly	Pro	Asn	Gly	Pro	Arg	Glu	Pro	
			260					265						270		
cga	ccg	ccg	gtg	gtg	ccc	gca	ccg	cgc	ccc	gcc	gaa	cag	cgc	acc	ggc	864
Arg	Pro	Pro	Val	Val	Pro	Ala	Pro	Arg	Pro	Ala	Glu	Gln	Arg	Thr	Gly	
		275					280					285				
cgg	ccg	gcg	gcc	ccg	ccc	gca	ccg	cgt	acc	ccg	gaa	ggt	ggt	ctt	gcc	912
Arg	Pro	Ala	Ala	Pro	Pro	Ala	Pro	Arg	Thr	Pro	Glu	Gly	Gly	Leu	Ala	
	290					295					300					
gcc	ggt	ggc	gcg	gcg	gcg	gcc	ggc	gtg	ggc	ggc	ggc	gac	gcg	acc	gcg	960
Ala	Gly	Gly	Ala	Ala	Ala	Ala	Gly	Val	Gly	Gly	Gly	Asp	Ala	Thr	Ala	
305					310					315					320	
aag	gtc	ccg	gcg	ggg	gtg	gac	gcc	gcg	ccg	acc	gcg	atg	gtc	gac	ctg	1008
Lys	Val	Pro	Ala	Gly	Val	Asp	Ala	Ala	Pro	Thr	Ala	Met	Val	Asp	Leu	
				325					330					335		
ccg	agc	gcc	gac	gcc	gat	ccg	acc	gcg	aag	gtc	acc	gac	ttc	ggc	ccg	1056
Pro	Ser	Ala	Asp	Ala	Asp	Pro	Thr	Ala	Lys	Val	Thr	Asp	Phe	Gly	Pro	
			340					345					350			
cag	gcg	gcc	gat	ccc	acc	gcg	aag	atc	ccc	gcc	ccc	gac	gcc	gcg	acc	1104
Gln	Ala	Ala	Asp	Pro	Thr	Ala	Lys	Ile	Pro	Ala	Pro	Asp	Ala	Ala	Thr	
		355					360					365				
agc	gcc	gac	gag	gct	gcg	ggc	acg	ccg	gcc	gga	ggg	agt	gac	ggg	ccg	1152
Ser	Ala	Asp	Glu	Ala	Ala	Gly	Thr	Pro	Ala	Gly	Gly	Ser	Asp	Gly	Pro	
	370					375					380					
ccg	gcg	gac	cgg	gcc	gcc	gag	gct	ggg	gac	gaa	ggg	gcc	gac	ggg	gcc	1200
Pro	Ala	Asp	Arg	Ala	Ala	Glu	Ala	Gly	Asp	Glu	Gly	Ala	Asp	Gly	Ala	
385					390					395					400	
ccg	gcg	gcc	ggt	cgg	gcc	gac	gac	acc	cga	gcc	gac	gac	acc	cgg	gtc	1248
Pro	Ala	Ala	Gly	Arg	Ala	Asp	Asp	Thr	Arg	Ala	Asp	Asp	Thr	Arg	Val	
				405				410						415		
gat	ccg	ggc	gcg	gct	gtg	ccc	gtt	tcg	ccg	ccc	gcc	ccg	gcc	cgc	gag	1296
Asp	Pro	Gly	Ala	Ala	Val	Pro	Val	Ser	Pro	Pro	Ala	Pro	Ala	Arg	Glu	
			420					425					430			
ccc	gcc	gtc	gcg	ccc	cgc	gag	gag	gcc	gcc	ccg	acg	tcg	gtg	ctg	ccg	1344
Pro	Ala	Val	Ala	Pro	Arg	Glu	Glu	Ala	Ala	Pro	Thr	Ser	Val	Leu	Pro	
		435					440					445				
gcc	gcc	tcc	ggc	ccg	gca	ctc	tcg	tcg	acg	ggc	cgg	gcc	acc	gtc	gtc	1392
Ala	Ala	Ser	Gly	Pro	Ala	Leu	Ser	Ser	Thr	Gly	Arg	Ala	Thr	Val	Val	
	450					455					460					

ggg ggc acg aag ccc gag cgt cgc cgc cgc ggc ctg ctg gtc ggc gcg Gly Gly Thr Lys Pro Glu Arg Arg Arg Arg Gly Leu Leu Val Gly Ala 465 470 475 480	1440
ctc gtc gcg gtg ctg ctg atc ggc ctg ctg gcg gcg gtg ccg ctg ctc Leu Val Ala Val Leu Leu Ile Gly Leu Leu Ala Ala Val Pro Leu Leu 485 490 495	1488
ggc cgg agc ggt gac gac gac ccg ggg ccc ggc ggc gac ccg cag gcg Gly Arg Ser Gly Asp Asp Asp Pro Gly Pro Gly Gly Asp Pro Gln Ala 500 505 510	1536
ggc gtg tcg acg ccg acg ccg tcg gcc gca ccg gcg acc agc agc gcg Gly Val Ser Thr Pro Thr Pro Ser Ala Ala Pro Ala Thr Ser Ser Ala 515 520 525	1584
gct ccg ccc agc ccg acg ccg tct gcc agc ccg tcc gtg gac ccg aac Ala Pro Pro Ser Pro Thr Pro Ser Ala Ser Pro Ser Val Asp Pro Asn 530 535 540	1632
gcc ctg ccc gag ggt tgg ctc ctg cac aag gac ccg gcg ggc ttc tcg Ala Leu Pro Glu Gly Trp Leu Leu His Lys Asp Pro Ala Gly Phe Ser 545 550 555 560	1680
ctg ccc ctg ccg aag ggc tgg gtg cgg cgc agc gtg ggg cag aac acg Leu Pro Leu Pro Lys Gly Trp Val Arg Arg Ser Val Gly Gln Asn Thr 565 570 575	1728
atc gtc ttc gac gag cgc gac ggg gtg ggc gag ctg ctg gtg cag tgg Ile Val Phe Asp Glu Arg Asp Gly Val Gly Glu Leu Leu Val Gln Trp 580 585 590	1776
acc agc acc ccg gag ggc gac gcc tac gcc gac tgg aaa gag aag gaa Thr Ser Thr Pro Glu Gly Asp Ala Tyr Ala Asp Trp Lys Glu Lys Glu 595 600 605	1824
ccg gcc cgg aag aac tac gtc aac ggc tac cag tat ctg agc atc aag Pro Ala Arg Lys Asn Tyr Val Asn Gly Tyr Gln Tyr Leu Ser Ile Lys 610 615 620	1872
cgc tgc gac tac tac aag acg tgc gcg gac tgg gag tgg ttg gag aac Arg Cys Asp Tyr Tyr Lys Thr Cys Ala Asp Trp Glu Trp Leu Glu Asn 625 630 635 640	1920
cgg gac ggc act cgg atc cac gtc cgc aac cgg ggc ttc gtc acg gcc Arg Asp Gly Thr Arg Ile His Val Arg Asn Arg Gly Phe Val Thr Ala 645 650 655	1968
agc aac cgg ggg tac gcc ctc cgg tgg gag gtg gcg aac aag gac tgg Ser Asn Arg Gly Tyr Ala Leu Arg Trp Glu Val Ala Asn Lys Asp Trp 660 665 670	2016
cag gcg cgg ctg gcc gac ttc gac cgg atc gcc aag ggc ttc aag ccg Gln Ala Arg Leu Ala Asp Phe Asp Arg Ile Ala Lys Gly Phe Lys Pro 675 680 685	2064
gac cgg gtc gac Asp Arg Val Asp 690	2076

<210> 79

<211> 692

<212> PRT

<213> Micromonospora carbonacea

<220>

<223> evsA

<400> 79

Met	Gly	Arg	Val	Trp	Lys	Ala	Arg	Asp	Glu	Val	Leu	His	Arg	Asp	Val
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Ala	Ile	Lys	Glu	Leu	Val	Pro	Pro	Pro	Ser	Leu	Thr	Pro	Glu	Glu	Arg
			20					25					30		
Arg	Glu	Met	Arg	Glu	Arg	Ser	Leu	Arg	Glu	Ala	Arg	Ala	Ile	Ala	Arg
		35					40					45			
Leu	Asn	His	Val	Asn	Val	Val	Arg	Ile	Phe	Asp	Val	Leu	Arg	Thr	Asp
	50					55					60				
Gly	Asp	Pro	Trp	Ile	Val	Met	Glu	Tyr	Val	Ala	Ser	Lys	Ser	Leu	Gln
65				70						75					80
Asp	Thr	Leu	Ala	Glu	Asp	Gly	Pro	Val	Ser	Pro	Ala	Lys	Ala	Val	Glu
				85					90					95	
Ile	Gly	Leu	Gly	Val	Leu	Gly	Ala	Leu	Lys	Ala	Ala	His	Lys	Ala	Gly
			100					105					110		
Val	Met	His	Arg	Asp	Ile	Lys	Pro	Gly	Asn	Val	Leu	Leu	Gly	Thr	Asp
		115					120					125			
Gly	Arg	Val	Val	Leu	Thr	Asp	Phe	Gly	Leu	Ala	Thr	Ile	Pro	Gly	Asp
	130					135					140				
Pro	Asn	Val	Thr	Arg	Thr	Gly	Met	Val	Leu	Gly	Ser	Pro	Ala	Tyr	Ile
145					150					155					160
Ala	Pro	Glu	Arg	Ala	Arg	Asp	Gly	Thr	Ala	Gly	Pro	Glu	Ala	Asp	Leu
				165					170					175	
Trp	Ser	Leu	Gly	Ala	Thr	Leu	Tyr	Ala	Ala	Val	Glu	Gly	Lys	Ser	Pro
			180					185					190		
Phe	Ala	Arg	Pro	Ser	Ala	Ile	Ala	Thr	Leu	Ala	Ala	Leu	Ala	Thr	Glu
	195						200					205			
Pro	Met	Pro	Pro	Pro	Arg	Asn	Ala	Gly	Pro	Leu	Lys	Pro	Val	Leu	Asn
	210					215					220				
Gly	Leu	Leu	Arg	Lys	Asp	Pro	Ala	Glu	Arg	Ile	Asp	Ala	Glu	Val	Ala
225					230					235					240
Glu	Arg	Leu	Leu	Arg	Arg	Ala	Ala	Gly	Arg	Arg	Ala	Lys	Thr	Ile	Ser
				245					250					255	
Leu	Leu	Asp	Gly	Val	Arg	Arg	Pro	Gly	Pro	Asn	Gly	Pro	Arg	Glu	Pro
			260					265					270		
Arg	Pro	Pro	Val	Val	Pro	Ala	Pro	Arg	Pro	Ala	Glu	Gln	Arg	Thr	Gly
		275					280					285			
Arg	Pro	Ala	Ala	Pro	Pro	Ala	Pro	Arg	Thr	Pro	Glu	Gly	Gly	Leu	Ala
	290					295					300				
Ala	Gly	Gly	Ala	Ala	Ala	Ala	Gly	Val	Gly	Gly	Gly	Asp	Ala	Thr	Ala
305					310					315					320

Lys Val Pro Ala Gly Val Asp Ala Ala Pro Thr Ala Met Val Asp Leu
 325 330 335
 Pro Ser Ala Asp Ala Asp Pro Thr Ala Lys Val Thr Asp Phe Gly Pro
 340 345 350
 Gln Ala Ala Asp Pro Thr Ala Lys Ile Pro Ala Pro Asp Ala Ala Thr
 355 360 365
 Ser Ala Asp Glu Ala Ala Gly Thr Pro Ala Gly Gly Ser Asp Gly Pro
 370 375 380
 Pro Ala Asp Arg Ala Ala Glu Ala Gly Asp Glu Gly Ala Asp Gly Ala
 385 390 395 400
 Pro Ala Ala Gly Arg Ala Asp Asp Thr Arg Ala Asp Asp Thr Arg Val
 405 410 415
 Asp Pro Gly Ala Ala Val Pro Val Ser Pro Pro Ala Pro Ala Arg Glu
 420 425 430
 Pro Ala Val Ala Pro Arg Glu Glu Ala Ala Pro Thr Ser Val Leu Pro
 435 440 445
 Ala Ala Ser Gly Pro Ala Leu Ser Ser Thr Gly Arg Ala Thr Val Val
 450 455 460
 Gly Gly Thr Lys Pro Glu Arg Arg Arg Arg Gly Leu Leu Val Gly Ala
 465 470 475 480
 Leu Val Ala Val Leu Leu Ile Gly Leu Leu Ala Ala Val Pro Leu Leu
 485 490 495
 Gly Arg Ser Gly Asp Asp Asp Pro Gly Pro Gly Gly Asp Pro Gln Ala
 500 505 510
 Gly Val Ser Thr Pro Thr Pro Ser Ala Ala Pro Ala Thr Ser Ser Ala
 515 520 525
 Ala Pro Pro Ser Pro Thr Pro Ser Ala Ser Pro Ser Val Asp Pro Asn
 530 535 540
 Ala Leu Pro Glu Gly Trp Leu Leu His Lys Asp Pro Ala Gly Phe Ser
 545 550 555 560
 Leu Pro Leu Pro Lys Gly Trp Val Arg Arg Ser Val Gly Gln Asn Thr
 565 570 575
 Ile Val Phe Asp Glu Arg Asp Gly Val Gly Glu Leu Leu Val Gln Trp
 580 585 590
 Thr Ser Thr Pro Glu Gly Asp Ala Tyr Ala Asp Trp Lys Glu Lys Glu
 595 600 605
 Pro Ala Arg Lys Asn Tyr Val Asn Gly Tyr Gln Tyr Leu Ser Ile Lys
 610 615 620
 Arg Cys Asp Tyr Tyr Lys Thr Cys Ala Asp Trp Glu Trp Leu Glu Asn
 625 630 635 640
 Arg Asp Gly Thr Arg Ile His Val Arg Asn Arg Gly Phe Val Thr Ala
 645 650 655
 Ser Asn Arg Gly Tyr Ala Leu Arg Trp Glu Val Ala Asn Lys Asp Trp
 660 665 670

Gln Ala Arg Leu Ala Asp Phe Asp Arg Ile Ala Lys Gly Phe Lys Pro
 675 680 685

Asp Arg Val Asp
 690

<210> 80
 <211> 1086
 <212> DNA
 <213> Micromonospora carbonacea

<220>
 <221> CDS
 <222> (1)..(1086)

<220>
 <223> evsB

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 Val Arg Ala Ser Pro Glu Thr Asp Gly Ala Leu Arg Ile Arg Ala Asp
 1 5 10 15
 cag tgg cac ctt aac tac ctg aag gcg gcg gag gct cag aag ctg tca 96
 Gln Trp His Leu Asn Tyr Leu Lys Ala Ala Glu Ala Gln Lys Leu Ser
 20 25 30
 ctg gga gaa ggg gtt gta gta gcg gtc ccg gat act ggc gtt gat cca 144
 Leu Gly Glu Gly Val Val Val Ala Val Pro Asp Thr Gly Val Asp Pro
 35 40 45
 cac ccc gac ctt cag cgc aat cta atc aaa ggg att gac atc att ccc 192
 His Pro Asp Leu Gln Arg Asn Leu Ile Lys Gly Ile Asp Ile Ile Pro
 50 55 60
 ggg ggc aat gga gat ggc cag aaa gat cgc aac agt cac ggc act agc 240
 Gly Gly Asn Gly Asp Gly Gln Lys Asp Arg Asn Ser His Gly Thr Ser
 65 70 75 80
 atg gct gga cta atc gca gcc cac gga cag ggc cag agc ggc gcc tta 288
 Met Ala Gly Leu Ile Ala Ala His Gly Gln Gly Gln Ser Gly Ala Leu
 85 90 95
 ggc ata gca ccc aga gcc aag atc atg cca atc ctg tct tcc gcg tcg 336
 Gly Ile Ala Pro Arg Ala Lys Ile Met Pro Ile Leu Ser Ser Ala Ser
 100 105 110
 aac aac ctc ggt gat gca gac ggc ttg gct gcg ggt ata gaa ttt gca 384
 Asn Asn Leu Gly Asp Ala Asp Gly Leu Ala Ala Gly Ile Glu Phe Ala
 115 120 125
 atc tcg cat ggg gcg gat gtc atc aat gtc tcc agc gga ggc ggc gcc 432
 Ile Ser His Gly Ala Asp Val Ile Asn Val Ser Ser Gly Gly Gly Ala
 130 135 140
 agc gtt cga ctc atc aag gca atc aga gag gcg gtc gcc gca gac att 480
 Ser Val Arg Leu Ile Lys Ala Ile Arg Glu Ala Val Ala Ala Asp Ile
 145 150 155 160
 gta gtt gtc gca gcc gcc gga aac agt ccc gaa gac atg aca att ggc 528
 Val Val Val Ala Ala Ala Gly Asn Ser Pro Glu Asp Met Thr Ile Gly
 165 170 175

tat cca gcc agc gag gaa gga gtc gtc gca gtt ggc gga att gat cga	576
Tyr Pro Ala Ser Glu Glu Gly Val Val Ala Val Gly Gly Ile Asp Arg	
180	185
cag gga gag cat gct tca gtt tct gtc gtc gga ccg gaa gtt gac tta	624
Gln Gly Glu His Ala Ser Val Ser Val Val Gly Pro Glu Val Asp Leu	
195	200
205	
gtc gca ccg gca gtc gac atc tac agc acc agt tac gac ggg aag tac	672
Val Ala Pro Ala Val Asp Ile Tyr Ser Thr Ser Tyr Asp Gly Lys Tyr	
210	215
220	
tcc aaa ggc acc ggt acg tcc agt gcc aca gcg ata gtc gca ggg gcc	720
Ser Lys Gly Thr Gly Thr Ser Ser Ala Thr Ala Ile Val Ala Gly Ala	
225	230
235	240
gct gct ctg gtc cga tcg aag ttt ccc gac ctg ccc gcc tcg gag gtc	768
Ala Ala Leu Val Arg Ser Lys Phe Pro Asp Leu Pro Ala Ser Glu Val	
245	250
255	
gtc cat cgc ctc act gcc acc gcc atc gac aaa ggg ccg cca ggg cac	816
Val His Arg Leu Thr Ala Thr Ala Ile Asp Lys Gly Pro Pro Gly His	
260	265
270	
gac gac cag tac ggc tac ggc gtt atc gac ctg gtt gcc gcg ctt acg	864
Asp Asp Gln Tyr Gly Tyr Gly Val Ile Asp Leu Val Ala Ala Leu Thr	
275	280
285	
gca gac gta ccc ccg gtg ggc ttt gag tcg gcg acg gcg gac gtg ccc	912
Ala Asp Val Pro Pro Val Gly Phe Glu Ser Ala Thr Ala Asp Val Pro	
290	295
300	
gac gtg cct ggg tcg acc acg acg gcg gtc gcc gag ccg gca ggc gag	960
Asp Val Pro Gly Ser Thr Thr Ala Val Ala Glu Pro Ala Gly Glu	
305	310
315	320
ggc gac gat ggg gca acg gcc cga ggt ctg gcc acg ttg gga gtg atc	1008
Gly Asp Asp Gly Ala Thr Ala Arg Gly Leu Ala Thr Leu Gly Val Ile	
325	330
335	
gtg gct gct gcg ggc gct tgg gcg ctg gtc gct cga ccg cgt agg ttg	1056
Val Ala Ala Ala Gly Ala Trp Ala Leu Val Ala Arg Arg Arg Arg Leu	
340	345
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agc gac gac ccg ccc ccg cgg atc agc cgg	1086
Ser Asp Asp Pro Pro Pro Arg Ile Ser Arg	
355	360

<210> 81

<211> 362

<212> PRT

<213> Micromonospora carbonacea

<220>

<223> evsB

<400> 81

Val Arg Ala Ser Pro Glu Thr Asp Gly Ala Leu Arg Ile Arg Ala Asp
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Gln Trp His Leu Asn Tyr Leu Lys Ala Ala Glu Ala Gln Lys Leu Ser
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Leu Gly Glu Gly Val Val Val Ala Val Pro Asp Thr Gly Val Asp Pro
 35 40 45
 His Pro Asp Leu Gln Arg Asn Leu Ile Lys Gly Ile Asp Ile Ile Pro
 50 55 60
 Gly Gly Asn Gly Asp Gly Gln Lys Asp Arg Asn Ser His Gly Thr Ser
 65 70 75 80
 Met Ala Gly Leu Ile Ala Ala His Gly Gln Gly Gln Ser Gly Ala Leu
 85 90 95
 Gly Ile Ala Pro Arg Ala Lys Ile Met Pro Ile Leu Ser Ser Ala Ser
 100 105 110
 Asn Asn Leu Gly Asp Ala Asp Gly Leu Ala Ala Gly Ile Glu Phe Ala
 115 120 125
 Ile Ser His Gly Ala Asp Val Ile Asn Val Ser Ser Gly Gly Gly Ala
 130 135 140
 Ser Val Arg Leu Ile Lys Ala Ile Arg Glu Ala Val Ala Ala Asp Ile
 145 150 155 160
 Val Val Val Ala Ala Ala Gly Asn Ser Pro Glu Asp Met Thr Ile Gly
 165 170 175
 Tyr Pro Ala Ser Glu Glu Gly Val Val Ala Val Gly Gly Ile Asp Arg
 180 185 190
 Gln Gly Glu His Ala Ser Val Ser Val Val Gly Pro Glu Val Asp Leu
 195 200 205
 Val Ala Pro Ala Val Asp Ile Tyr Ser Thr Ser Tyr Asp Gly Lys Tyr
 210 215 220
 Ser Lys Gly Thr Gly Thr Ser Ser Ala Thr Ala Ile Val Ala Gly Ala
 225 230 235 240
 Ala Ala Leu Val Arg Ser Lys Phe Pro Asp Leu Pro Ala Ser Glu Val
 245 250 255
 Val His Arg Leu Thr Ala Thr Ala Ile Asp Lys Gly Pro Pro Gly His
 260 265 270
 Asp Asp Gln Tyr Gly Tyr Gly Val Ile Asp Leu Val Ala Ala Leu Thr
 275 280 285
 Ala Asp Val Pro Pro Val Gly Phe Glu Ser Ala Thr Ala Asp Val Pro
 290 295 300
 Asp Val Pro Gly Ser Thr Thr Thr Ala Val Ala Glu Pro Ala Gly Glu
 305 310 315 320
 Gly Asp Asp Gly Ala Thr Ala Arg Gly Leu Ala Thr Leu Gly Val Ile
 325 330 335
 Val Ala Ala Ala Gly Ala Trp Ala Leu Val Ala Arg Arg Arg Arg Leu
 340 345 350
 Ser Asp Asp Pro Pro Pro Arg Ile Ser Arg
 355 360

<210> 82
 <211> 666
 <212> DNA
 <213> Micromonospora carbonacea

<220>
 <221> CDS
 <222> (1) .. (666)

<220>
 <223> evsC

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gcc cgt cgc aag ctc ctc cac gcc gcc ggc atc gaa ccc gac gtg ctg 96
 Ala Arg Arg Lys Leu Leu His Ala Ala Gly Ile Glu Pro Asp Val Leu
 20 25 30

gtc agt ggg gtc gac gag tcc cag gtg acc agc gag cga gcc gag gat 144
 Val Ser Gly Val Asp Glu Ser Gln Val Thr Ser Glu Arg Ala Glu Asp
 35 40 45

ctg tgc ctg gag ctg gcc cgc ctg aag gcg cag gcg gtc gtc ggc cgg 192
 Leu Cys Leu Glu Leu Ala Arg Leu Lys Ala Gln Ala Val Val Gly Arg
 50 55 60

ctg cgc ccg tcg gcc gac gag cgg acg ctg gtg ctc ggc tgc gac tcg 240
 Leu Arg Pro Ser Ala Asp Glu Arg Thr Leu Val Leu Gly Cys Asp Ser
 65 70 75 80

gtg ctc gcc ttc gac cgc gag att ctc ggc aag ccg gcc gac gag gcg 288
 Val Leu Ala Phe Asp Arg Glu Ile Leu Gly Lys Pro Ala Asp Glu Ala
 85 90 95

gac gct acc cgg cgt tgg gag cgg atg cgg ggg cgc agc ggg gtg cta 336
 Asp Ala Thr Arg Arg Trp Glu Arg Met Arg Gly Arg Ser Gly Val Leu
 100 105 110

cac acc ggg cac tgc ctg atc gac gtc atc cac gag acg cgc gcc gag 384
 His Thr Gly His Cys Leu Ile Asp Val Ile His Glu Thr Arg Ala Glu
 115 120 125

gcg gtc gcc tcg acc acc gtg cgt ttc gct gac atc agc gac gag gag 432
 Ala Val Ala Ser Thr Thr Val Arg Phe Ala Asp Ile Ser Asp Glu Glu
 130 135 140

att gcc gcg tac gtc gcg acg ggc gaa ccg ctc gcg gtc gcc ggc gcg 480
 Ile Ala Ala Tyr Val Ala Thr Gly Glu Pro Leu Ala Val Ala Gly Ala
 145 150 155 160

ttc acc atc gac gga atg ggc ggg gcg ttc ctg gag ggt gtc gac ggc 528
 Phe Thr Ile Asp Gly Met Gly Gly Ala Phe Leu Glu Gly Val Asp Gly
 165 170 175

gac ccg ggc acg gtg gtc ggc ctc tcc cta ccg ttg ctg cgc cgg ctt 576
 Asp Pro Gly Thr Val Val Gly Leu Ser Leu Pro Leu Leu Arg Arg Leu
 180 185 190

ctc ggc gag ctg gac ctg cgg atc atc gac ctg tgg acg aag gtc gcg 624
 Leu Gly Glu Leu Asp Leu Arg Ile Ile Asp Leu Trp Thr Lys Val Ala
 195 200 205

ccg ggc ggc cag gcg gtc gag gcg gtg ggt acg gtc cag cca
 Pro Gly Gly Gln Ala Val Glu Ala Val Gly Thr Val Gln Pro
 210 215 220

666

<210> 83
 <211> 222
 <212> PRT
 <213> Micromonospora carbonacea

<220>
 <223> evsC

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 Ala Arg Arg Lys Leu Leu His Ala Ala Gly Ile Glu Pro Asp Val Leu
 20 25 30
 Val Ser Gly Val Asp Glu Ser Gln Val Thr Ser Glu Arg Ala Glu Asp
 35 40 45
 Leu Cys Leu Glu Leu Ala Arg Leu Lys Ala Gln Ala Val Val Gly Arg
 50 55 60
 Leu Arg Pro Ser Ala Asp Glu Arg Thr Leu Val Leu Gly Cys Asp Ser
 65 70 75 80
 Val Leu Ala Phe Asp Arg Glu Ile Leu Gly Lys Pro Ala Asp Glu Ala
 85 90 95
 Asp Ala Thr Arg Arg Trp Glu Arg Met Arg Gly Arg Ser Gly Val Leu
 100 105 110
 His Thr Gly His Cys Leu Ile Asp Val Ile His Glu Thr Arg Ala Glu
 115 120 125
 Ala Val Ala Ser Thr Thr Val Arg Phe Ala Asp Ile Ser Asp Glu Glu
 130 135 140
 Ile Ala Ala Tyr Val Ala Thr Gly Glu Pro Leu Ala Val Ala Gly Ala
 145 150 155 160
 Phe Thr Ile Asp Gly Met Gly Gly Ala Phe Leu Glu Gly Val Asp Gly
 165 170 175
 Asp Pro Gly Thr Val Val Gly Leu Ser Leu Pro Leu Leu Arg Arg Leu
 180 185 190
 Leu Gly Glu Leu Asp Leu Arg Ile Ile Asp Leu Trp Thr Lys Val Ala
 195 200 205
 Pro Gly Gly Gln Ala Val Glu Ala Val Gly Thr Val Gln Pro
 210 215 220

<210> 84
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 <212> DNA
 <213> Micromonospora carbonacea

<220>
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<222> (1) .. (651)

<220>

<223> evbA

<400> 84

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Met	Thr	Thr	Lys	Ser	Leu	Pro	Leu	Thr	Pro	Glu	Leu	His	Ala	Tyr	Val	
1				5					10					15		
gtg	gcc	cac	gga	tcg	gac	ccg	gac	gag	gtg	atg	cgg	gat	ctg	atc	gag	96
Val	Ala	His	Gly	Ser	Asp	Pro	Asp	Glu	Val	Met	Arg	Asp	Leu	Ile	Glu	
			20					25					30			
gag	acc	ctc	gcc	gcg	ctg	ccc	gcc	gag	gcg	agg	atg	cag	gtg	gcc	ccg	144
Glu	Thr	Leu	Ala	Ala	Leu	Pro	Ala	Glu	Ala	Arg	Met	Gln	Val	Ala	Pro	
		35				40						45				
gag	caa	gcc	gcg	ttc	ctg	acg	ttc	ctc	acc	cgg	ttg	atc	ggg	gcg	cgg	192
Glu	Gln	Ala	Ala	Phe	Leu	Thr	Phe	Leu	Thr	Arg	Leu	Ile	Gly	Ala	Arg	
	50				55						60					
cgg	gcg	gtg	gag	gtg	ggc	acc	ttc	acc	ggc	ctg	tcc	tcc	ctg	gcg	atc	240
Arg	Ala	Val	Glu	Val	Gly	Thr	Phe	Thr	Gly	Leu	Ser	Ser	Leu	Ala	Ile	
65					70				75						80	
gcg	cgc	ggg	ctg	gcc	gag	ggc	ggg	cgg	ttg	acc	tgc	ttc	gac	atc	tcg	288
Ala	Arg	Gly	Leu	Ala	Glu	Gly	Gly	Arg	Leu	Thr	Cys	Phe	Asp	Ile	Ser	
				85				90						95		
gag	gag	tac	acg	ggc	gtc	gcg	cgg	cgg	tac	tgg	gcg	cgg	gcc	ggg	gtg	336
Glu	Glu	Tyr	Thr	Gly	Val	Ala	Arg	Arg	Tyr	Trp	Ala	Arg	Ala	Gly	Val	
			100					105					110			
gcc	gac	cag	atc	gac	ctg	cgg	atc	ggg	ccg	gcc	ggg	gac	acg	ctg	cgc	384
Ala	Asp	Gln	Ile	Asp	Leu	Arg	Ile	Gly	Pro	Ala	Gly	Asp	Thr	Leu	Arg	
		115					120					125				
ggg	ttg	ccg	tac	gaa	cgg	cac	ctg	gac	ttc	gcg	ttc	atc	gac	gcg	gac	432
Gly	Leu	Pro	Tyr	Glu	Arg	His	Leu	Asp	Phe	Ala	Phe	Ile	Asp	Ala	Asp	
	130					135					140					
aag	gtc	ggc	tac	ccg	gtc	tac	tgg	gcg	gag	ttg	gtg	ccc	cgc	atg	ctc	480
Lys	Val	Gly	Tyr	Pro	Val	Tyr	Trp	Ala	Glu	Leu	Val	Pro	Arg	Met	Leu	
145					150					155					160	
ccg	ggc	ggg	gtc	atc	gcg	gtg	gac	aac	acg	ttg	cgc	ggg	ggc	cgg	gtg	528
Pro	Gly	Gly	Val	Ile	Ala	Val	Asp	Asn	Thr	Leu	Arg	Gly	Gly	Arg	Val	
				165					170					175		
ctc	gcc	ccg	cgt	gac	gcc	gac	gac	cgg	gcc	atc	gcc	gcg	ttc	aac	gac	576
Leu	Ala	Pro	Arg	Asp	Ala	Asp	Asp	Arg	Ala	Ile	Ala	Ala	Phe	Asn	Asp	
			180					185					190			
gag	gtg	atg	gcc	gac	gtc	cgg	gtg	gag	ccg	gtg	ctg	ctg	ccg	atc	gcc	624
Glu	Val	Met	Ala	Asp	Val	Arg	Val	Glu	Pro	Val	Leu	Leu	Pro	Ile	Ala	
		195				200						205				
gac	ggg	ctg	acc	ctg	gcc	cgg	gtg	cgc								651
Asp	Gly	Leu	Thr	Leu	Ala	Arg	Val	Arg								
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<211> 217

<212> PRT

<213> Micromonospora carbonacea

<220>

<223> evbA

<400> 85

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Met Thr Thr Lys Ser Leu Pro Leu Thr Pro Glu Leu His Ala Tyr Val
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Val Ala His Gly Ser Asp Pro Asp Glu Val Met Arg Asp Leu Ile Glu
          20          25          30

Glu Thr Leu Ala Ala Leu Pro Ala Glu Ala Arg Met Gln Val Ala Pro
      35          40          45

Glu Gln Ala Ala Phe Leu Thr Phe Leu Thr Arg Leu Ile Gly Ala Arg
      50          55          60

Arg Ala Val Glu Val Gly Thr Phe Thr Gly Leu Ser Ser Leu Ala Ile
      65          70          75          80

Ala Arg Gly Leu Ala Glu Gly Gly Arg Leu Thr Cys Phe Asp Ile Ser
          85          90          95

Glu Glu Tyr Thr Gly Val Ala Arg Arg Tyr Trp Ala Arg Ala Gly Val
          100          105          110

Ala Asp Gln Ile Asp Leu Arg Ile Gly Pro Ala Gly Asp Thr Leu Arg
      115          120          125

Gly Leu Pro Tyr Glu Arg His Leu Asp Phe Ala Phe Ile Asp Ala Asp
      130          135          140

Lys Val Gly Tyr Pro Val Tyr Trp Ala Glu Leu Val Pro Arg Met Leu
      145          150          155          160

Pro Gly Gly Val Ile Ala Val Asp Asn Thr Leu Arg Gly Gly Arg Val
          165          170          175

Leu Ala Pro Arg Asp Ala Asp Asp Arg Ala Ile Ala Ala Phe Asn Asp
          180          185          190

Glu Val Met Ala Asp Val Arg Val Glu Pro Val Leu Leu Pro Ile Ala
      195          200          205

Asp Gly Leu Thr Leu Ala Arg Val Arg
      210          215

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<210> 86

<211> 753

<212> DNA

<213> Micromonospora carbonacea

<220>

<221> CDS

<222> (1)..(753)

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<223> evbB

<400> 86

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ctc	ctg	ctc	cgc	aat	ccg	gtc	tgg	gtc	ttc	gtc	ggc	gtc	ttc	cag	ccg	96
Leu	Leu	Leu	Arg 20	Asn	Pro	Val	Trp	Val 25	Phe	Val	Gly	Val	Phe 30	Gln	Pro	
gtg	atg	tac	ctg	ctc	ctc	ttc	gcc	ccg	ctg	ctc	aag	ccc	gcg	ctg	aac	144
Val	Met	Tyr 35	Leu	Leu	Leu	Phe	Ala 40	Pro	Leu	Leu	Lys	Pro 45	Ala	Leu	Asn	
gcg	ccg	acc	cag	gcc	gag	gcg	tac	aag	atc	ttc	gtg	ccc	ggc	ctg	ctg	192
Ala	Pro	Thr 50	Gln	Ala	Glu	Ala 55	Tyr	Lys	Ile	Phe	Val 60	Pro	Gly	Leu	Leu	
gtg	ctg	ctg	gcc	atc	ttc	ggc	ggc	ctc	ttc	cag	ggc	ttc	ggc	ctg	atc	240
Val 65	Leu	Leu	Ala	Ile 70	Phe	Gly	Gly	Leu	Phe	Gln 75	Gly	Phe	Gly	Leu	Ile 80	
gcc	gag	ctg	cgc	gcc	ggc	gtc	atc	gaa	cgg	tcc	cgg	gtc	acc	ccg	gtc	288
Ala	Glu	Leu	Arg 85	Ala	Gly	Val	Ile	Glu	Arg 90	Ser	Arg	Val	Thr	Pro 95	Val	
agc	cgg	ctc	gcg	ctg	ctg	ctc	ggc	cgg	gcc	ctg	cgc	gac	gtc	gtg	tcg	336
Ser	Arg	Leu 100	Ala	Leu	Leu	Leu	Gly	Arg 105	Ala	Leu	Arg	Asp 110	Val	Val	Ser	
ctg	ctc	gcc	cag	gcc	gtc	atc	atc	acc	ctg	ctc	gcg	ctc	ctg	ttc	gag	384
Leu	Leu	Ala 115	Gln	Ala	Val	Ile	Ile 120	Thr	Leu	Leu	Ala	Leu 125	Leu	Phe	Glu	
ctg	cgc	gtg	ttc	atc	ggc	gac	ctg	ctg	ctg	gcg	tac	ctg	atg	ctc	gcc	432
Leu	Arg 130	Val	Phe	Ile	Gly	Asp 135	Leu	Leu	Leu	Ala	Tyr 140	Leu	Met	Leu	Ala	
ctg	atc	gcg	ctg	atg	acc	tcg	gcc	gtc	tcg	tac	ggc	gtc	gcg	ctc	aag	480
Leu 145	Ile	Ala	Leu	Met 150	Thr	Ser	Ala	Val	Ser	Tyr 155	Gly	Val	Ala	Leu	Lys 160	
gtc	aag	agt	gag	gac	gcg	ctc	gcc	ccg	gtg	atg	aac	acc	gtc	gcc	cag	528
Val	Lys	Ser	Glu 165	Asp	Ala	Leu	Ala	Pro	Val 170	Met	Asn	Thr	Val	Ala	Gln 175	
ccg	gtg	ctg	ctg	ctc	tcc	ggc	atc	ctg	ctg	ccg	ctc	acc	ttc	gcc	ccc	576
Pro	Val	Leu 180	Leu	Leu	Ser	Gly	Ile	Leu 185	Leu	Pro	Leu	Thr 190	Phe	Ala	Pro	
ggc	tgg	ctc	cag	cgc	atc	gcc	gag	tgg	aac	ccg	ttc	tcc	tgg	gcc	gtg	624
Gly	Trp	Leu 195	Gln	Arg	Ile	Ala	Glu 200	Trp	Asn	Pro	Phe	Ser 205	Trp	Ala	Val	
gac	ggc	acc	cgg	gcc	ctc	ttc	gcc	ggc	gac	ctc	ggc	aac	gac	aag	gtc	672
Asp 210	Gly	Thr	Arg	Ala	Leu	Phe 215	Ala	Gly	Asp	Leu	Gly 220	Asn	Asp	Lys	Val	
tgg	cag	ggc	ctg	acc	atc	atc	gcg	gtg	ctt	gcc	gcc	gtc	ggc	gtc	gcc	720
Trp 225	Gln	Gly	Leu	Thr 230	Ile	Ile	Ala	Val	Leu	Ala 235	Ala	Val	Gly	Val	Ala 240	
tgg	gcc	gcc	cgc	cag	ttc	gcc	cgc	agc	gtg	cgc						753
Trp	Ala	Ala	Arg 245	Gln	Phe	Ala	Arg	Ser	Val 250	Arg						

<210> 87
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 <212> PRT
 <213> Micromonospora carbonacea

<220>
 <223> evbB

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 Leu Leu Leu Arg Asn Pro Val Trp Val Phe Val Gly Val Phe Gln Pro
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 Val Met Tyr Leu Leu Leu Phe Ala Pro Leu Leu Lys Pro Ala Leu Asn
 35 40 45
 Ala Pro Thr Gln Ala Glu Ala Tyr Lys Ile Phe Val Pro Gly Leu Leu
 50 55 60
 Val Leu Leu Ala Ile Phe Gly Gly Leu Phe Gln Gly Phe Gly Leu Ile
 65 70 75 80
 Ala Glu Leu Arg Ala Gly Val Ile Glu Arg Ser Arg Val Thr Pro Val
 85 90 95
 Ser Arg Leu Ala Leu Leu Leu Gly Arg Ala Leu Arg Asp Val Val Ser
 100 105 110
 Leu Leu Ala Gln Ala Val Ile Ile Thr Leu Leu Ala Leu Leu Phe Glu
 115 120 125
 Leu Arg Val Phe Ile Gly Asp Leu Leu Leu Ala Tyr Leu Met Leu Ala
 130 135 140
 Leu Ile Ala Leu Met Thr Ser Ala Val Ser Tyr Gly Val Ala Leu Lys
 145 150 155 160
 Val Lys Ser Glu Asp Ala Leu Ala Pro Val Met Asn Thr Val Ala Gln
 165 170 175
 Pro Val Leu Leu Leu Ser Gly Ile Leu Leu Pro Leu Thr Phe Ala Pro
 180 185 190
 Gly Trp Leu Gln Arg Ile Ala Glu Trp Asn Pro Phe Ser Trp Ala Val
 195 200 205
 Asp Gly Thr Arg Ala Leu Phe Ala Gly Asp Leu Gly Asn Asp Lys Val
 210 215 220
 Trp Gln Gly Leu Thr Ile Ile Ala Val Leu Ala Ala Val Gly Val Ala
 225 230 235 240
 Trp Ala Ala Arg Gln Phe Ala Arg Ser Val Arg
 245 250

<210> 88
 <211> 957
 <212> DNA
 <213> Micromonospora carbonacea
 <220>

<221> CDS

<222> (1)..(957)

<220>

<223> evbC

<400> 88

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cga cag cac aag acg gtc gac gcc gtg cgc ggc gtc gac ctg gac gtc	96
Arg Gln His Lys Thr Val Asp Ala Val Arg Gly Val Asp Leu Asp Val	
20 25 30	
gcc gag ggg gag atc ttc ggg ttc ctc ggc ccc aac ggc gcc ggg aag	144
Ala Glu Gly Glu Ile Phe Gly Phe Leu Gly Pro Asn Gly Ala Gly Lys	
35 40 45	
acc acc acc ctg cgg atg ctg gcc acc ctc atc acc ccc gac ggc ggc	192
Thr Thr Thr Leu Arg Met Leu Ala Thr Leu Ile Thr Pro Asp Gly Gly	
50 55 60	
cag gcc acc atc gcc ggg gcc gac ctg ctg cgg aac ccg gcc gag gtg	240
Gln Ala Thr Ile Ala Gly Ala Asp Leu Leu Arg Asn Pro Ala Glu Val	
65 70 75 80	
cgt cgc cgg atc ggc tat gtc gcc cag ggc ggc agc acc tgg gac gac	288
Arg Arg Arg Ile Gly Tyr Val Ala Gln Gly Gly Ser Thr Trp Asp Asp	
85 90 95	
tcc acc gcc cgc gag gaa ctg gtc ctg cac gcc cgg atg tac ggc atc	336
Ser Thr Ala Arg Glu Glu Leu Val Leu His Ala Arg Met Tyr Gly Ile	
100 105 110	
ggc aag gcc gac gcc ctc cgc cgc gcc gag cgc gca ctg gcc gcc ttc	384
Gly Lys Ala Asp Ala Leu Arg Arg Ala Glu Arg Ala Leu Ala Ala Phe	
115 120 125	
cag ctc acc gag tac gcc gac cgt aag tgc aag acc tac tcc ggc ggc	432
Gln Leu Thr Glu Tyr Ala Asp Arg Lys Cys Lys Thr Tyr Ser Gly Gly	
130 135 140	
cag cgc cgc cgc gtc gag atc gct ctc ggc atc atc cac gac ccc cgc	480
Gln Arg Arg Arg Val Glu Ile Ala Leu Gly Ile Ile His Asp Pro Arg	
145 150 155 160	
att gtc ttc ctg gac gag ccg acc agc ggc ctc gac ccg cag agt cgc	528
Ile Val Phe Leu Asp Glu Pro Thr Ser Gly Leu Asp Pro Gln Ser Arg	
165 170 175	
gcc cac atg tgg gac gag atc cgt cgg ctg cgc gcc gag ggg atg acc	576
Ala His Met Trp Asp Glu Ile Arg Arg Leu Arg Ala Glu Gly Met Thr	
180 185 190	
gtc ttc atc acc acg cac tac ctg gac gag gcc gac gcg ctc tgc gac	624
Val Phe Ile Thr Thr His Tyr Leu Asp Glu Ala Asp Ala Leu Cys Asp	
195 200 205	
cgg atc gcg atc atg gac cac ggc gag gtg gtc gcc gag ggt acg ccg	672
Arg Ile Ala Ile Met Asp His Gly Glu Val Val Ala Glu Gly Thr Pro	
210 215 220	
ggc ggg ctg aag cgg gag atc tcc ggc gag gtg ctg ctc gtc ggg ctg	720

Gly	Gly	Leu	Lys	Arg	Glu	Ile	Ser	Gly	Glu	Val	Leu	Leu	Val	Gly	Leu		
225					230					235					240		
gac	gcc	gcc	gcc	acc	ccg	cag	gcc	gcc	caa	ctg	ctc	gac	acc	gag	ccg	768	
Asp	Ala	Ala	Ala	Thr	Pro	Gln	Ala	Ala	Gln	Leu	Leu	Asp	Thr	Glu	Pro		
				245					250					255			
tac	gtc	acc	aag	ctg	gaa	acc	gtc	gac	ggc	ggc	ggc	ctg	cgc	ctg	acc	816	
Tyr	Val	Thr	Lys	Leu	Glu	Thr	Val	Asp	Gly	Gly	Gly	Leu	Arg	Leu	Thr		
			260					265					270				
gtc	gac	gag	ggg	gcc	acc	gcc	atc	ccg	cag	gtc	ctg	cgc	cgg	ctc	gac	864	
Val	Asp	Glu	Gly	Ala	Thr	Ala	Ile	Pro	Gln	Val	Leu	Arg	Arg	Leu	Asp		
		275					280					285					
cag	tcc	ggc	ctc	agg	ctc	agc	tcg	atc	gag	ctg	cac	cgc	ccc	agc	ctc	912	
Gln	Ser	Gly	Leu	Arg	Leu	Ser	Ser	Ile	Glu	Leu	His	Arg	Pro	Ser	Leu		
		290				295					300						
gac	gac	gtc	ttc	ctc	acc	aag	acc	ggc	cgc	tcg	ctg	cgc	gag	tcc		957	
Asp	Asp	Val	Phe	Leu	Thr	Lys	Thr	Gly	Arg	Ser	Leu	Arg	Glu	Ser			
305					310				315								

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<211> 319

<212> PRT

<213> Micromonospora carbonacea

<220>

<223> evbC

<400> 89

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Arg	Gln	His	Lys	Thr	Val	Asp	Ala	Val	Arg	Gly	Val	Asp	Leu	Asp	Val		
			20					25					30				
Ala	Glu	Gly	Glu	Ile	Phe	Gly	Phe	Leu	Gly	Pro	Asn	Gly	Ala	Gly	Lys		
		35				40						45					
Thr	Thr	Thr	Leu	Arg	Met	Leu	Ala	Thr	Leu	Ile	Thr	Pro	Asp	Gly	Gly		
		50				55					60						
Gln	Ala	Thr	Ile	Ala	Gly	Ala	Asp	Leu	Leu	Arg	Asn	Pro	Ala	Glu	Val		
		65			70					75					80		
Arg	Arg	Arg	Ile	Gly	Tyr	Val	Ala	Gln	Gly	Gly	Ser	Thr	Trp	Asp	Asp		
				85					90					95			
Ser	Thr	Ala	Arg	Glu	Glu	Leu	Val	Leu	His	Ala	Arg	Met	Tyr	Gly	Ile		
			100					105					110				
Gly	Lys	Ala	Asp	Ala	Leu	Arg	Arg	Ala	Glu	Arg	Ala	Leu	Ala	Ala	Phe		
		115					120					125					
Gln	Leu	Thr	Glu	Tyr	Ala	Asp	Arg	Lys	Cys	Lys	Thr	Tyr	Ser	Gly	Gly		
		130				135					140						
Gln	Arg	Arg	Arg	Val	Glu	Ile	Ala	Leu	Gly	Ile	Ile	His	Asp	Pro	Arg		
					150					155					160		
Ile	Val	Phe	Leu	Asp	Glu	Pro	Thr	Ser	Gly	Leu	Asp	Pro	Gln	Ser	Arg		
				165					170					175			

Ala His Met Trp Asp Glu Ile Arg Arg Leu Arg Ala Glu Gly Met Thr
180 185 190

Val Phe Ile Thr Thr His Tyr Leu Asp Glu Ala Asp Ala Leu Cys Asp
195 200 205

Arg Ile Ala Ile Met Asp His Gly Glu Val Val Ala Glu Gly Thr Pro
210 215 220

Gly Gly Leu Lys Arg Glu Ile Ser Gly Glu Val Leu Leu Val Gly Leu
225 230 235 240

Asp Ala Ala Ala Thr Pro Gln Ala Ala Gln Leu Leu Asp Thr Glu Pro
245 250 255

Tyr Val Thr Lys Leu Glu Thr Val Asp Gly Gly Gly Leu Arg Leu Thr
260 265 270

Val Asp Glu Gly Ala Thr Ala Ile Pro Gln Val Leu Arg Arg Leu Asp
275 280 285

Gln Ser Gly Leu Arg Leu Ser Ser Ile Glu Leu His Arg Pro Ser Leu
290 295 300

Asp Asp Val Phe Leu Thr Lys Thr Gly Arg Ser Leu Arg Glu Ser
305 310 315

<210> 90
<211> 594
<212> DNA
<213> Micromonospora carbonacea

<220>
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<222> (1)..(594)

<220>
<223> evbC2

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gac gtc cgc cgc gag ctg ctc agt tgg ggt gcc gac aag tgg gcc aac 96
Asp Val Arg Arg Glu Leu Leu Ser Trp Gly Ala Asp Lys Trp Ala Asn
20 25 30

gtg cag ccc ggc tcg atc tac cac gcg ctg cgc aag ctc ggc gag gag 144
Val Gln Pro Gly Ser Ile Tyr His Ala Leu Arg Lys Leu Gly Glu Glu
35 40 45

ggg ctg ctc cgc gag gtc gcc acc gag cag gtc ggc gcc cgg cgg gcg 192
Gly Leu Leu Arg Glu Val Ala Thr Glu Gln Val Gly Ala Arg Arg Ala
50 55 60

cgg acg acg tac gag atc acc ccg aag ggg gtc gac gag ttc gag acg 240
Arg Thr Thr Tyr Glu Ile Thr Pro Lys Gly Val Asp Glu Phe Glu Thr
65 70 75 80

ctg ctg cgc ggc ctg tgg tgg ggc aat cat cag acg agc gat ccg ttc 288
Leu Leu Arg Gly Leu Trp Trp Gly Asn His Gln Thr Ser Asp Pro Phe

85										90					95					
gtg	gcg	gcg	ttc	gcg	ttc	ctg	ccg	gcg	ctg	ccc	agg	ccg	gag	gcg	gtg	336				
Val	Ala	Ala	Phe	Ala	Phe	Leu	Pro	Ala	Leu	Pro	Arg	Pro	Glu	Ala	Val					
			100					105					110							
gcc	gcg	ctg	cgc	agt	cgg	ggg	cag	gtg	ctg	cgg	gcc	agt	gtc	gaa	acc	384				
Ala	Ala	Leu	Arg	Ser	Arg	Gly	Gln	Val	Leu	Arg	Ala	Ser	Val	Glu	Thr					
		115					120					125								
atg	cgt	gcc	tcg	atg	gag	tcc	tcc	tgg	atc	cgc	gac	tcc	aag	ccg	gtc	432				
Met	Arg	Ala	Ser	Met	Glu	Ser	Ser	Trp	Ile	Arg	Asp	Ser	Lys	Pro	Val					
	130					135					140									
ggc	gtg	agc	tgg	atg	tac	gag	ctg	tgg	att	gcc	cgg	gga	gag	gtc	gag	480				
Gly	Val	Ser	Trp	Met	Tyr	Glu	Leu	Trp	Ile	Ala	Arg	Gly	Glu	Val	Glu					
145					150					155					160					
gtg	gcc	tgg	tgt	gag	cgg	gtc	gcc	gac	cgg	atc	gag	gcc	ggc	gtg	ccg	528				
Val	Ala	Trp	Cys	Glu	Arg	Val	Ala	Asp	Arg	Ile	Glu	Ala	Gly	Val	Pro					
			165					170						175						
tat	ctg	ccc	gaa	ggg	ttg	gcc	agt	cag	gac	ggc	tgg	aac	gtg	ggg	gag	576				
Tyr	Leu	Pro	Glu	Gly	Leu	Ala	Ser	Gln	Asp	Gly	Trp	Asn	Val	Gly	Glu					
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ggg	gcc	gac	ggt	cgc	cat											594				
Gly	Ala	Asp	Gly	Arg	His															
		195																		

<210> 91

<211> 198

<212> PRT

<213> Micromonospora carbonacea

<220>

<223> evbC2

<400> 91

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			20					25					30		
Val	Gln	Pro	Gly	Ser	Ile	Tyr	His	Ala	Leu	Arg	Lys	Leu	Gly	Glu	Glu
		35					40					45			
Gly	Leu	Leu	Arg	Glu	Val	Ala	Thr	Glu	Gln	Val	Gly	Ala	Arg	Arg	Ala
	50					55					60				
Arg	Thr	Thr	Tyr	Glu	Ile	Thr	Pro	Lys	Gly	Val	Asp	Glu	Phe	Glu	Thr
	65				70					75					80
Leu	Leu	Arg	Gly	Leu	Trp	Trp	Gly	Asn	His	Gln	Thr	Ser	Asp	Pro	Phe
				85				90						95	
Val	Ala	Ala	Phe	Ala	Phe	Leu	Pro	Ala	Leu	Pro	Arg	Pro	Glu	Ala	Val
			100					105					110		
Ala	Ala	Leu	Arg	Ser	Arg	Gly	Gln	Val	Leu	Arg	Ala	Ser	Val	Glu	Thr
		115					120					125			
Met	Arg	Ala	Ser	Met	Glu	Ser	Ser	Trp	Ile	Arg	Asp	Ser	Lys	Pro	Val

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Gly Val Ser Trp Met Tyr Glu Leu Trp Ile Ala Arg Gly Glu Val Glu					
145		150		155	160
Val Ala Trp Cys Glu Arg Val Ala Asp Arg Ile Glu Ala Gly Val Pro					
	165		170		175
Tyr Leu Pro Glu Gly Leu Ala Ser Gln Asp Gly Trp Asn Val Gly Glu					
	180		185		190
Gly Ala Asp Gly Arg His					
	195				
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gtg cgc aag gta ctc atc gcc aac cga ggc gag atc gcc gtc cgc gtc					48
Val Arg Lys Val Leu Ile Ala Asn Arg Gly Glu Ile Ala Val Arg Val					
1	5	10	15		
atc cgc gcc tgc cgc gac gcc ggc ctg ggc agc gtc gcc gtc tac gcg					96
Ile Arg Ala Cys Arg Asp Ala Gly Leu Gly Ser Val Ala Val Tyr Ala					
	20	25	30		
gac tcc gac cgg gac gcc ctg cac gcg acc ctg gcc gac gag gcg tac					144
Asp Ser Asp Arg Asp Ala Leu His Ala Thr Leu Ala Asp Glu Ala Tyr					
	35	40	45		
gcc ctg ggc ggc gac acc gcc gcc gag acg tac ctg cgg atc gac aag					192
Ala Leu Gly Gly Asp Thr Ala Ala Glu Thr Tyr Leu Arg Ile Asp Lys					
	50	55	60		
ctg atc gcc gtc gcg gca cag gcc ggg gcc gac gcc gtc cac ccc ggg					240
Leu Ile Ala Val Ala Ala Gln Ala Gly Ala Asp Ala Val His Pro Gly					
	65	70	75	80	
tac ggc ttc ctc gcc gag aac gcc gac ttc gcc cag gcc gtc ctc gac					288
Tyr Gly Phe Leu Ala Glu Asn Ala Asp Phe Ala Gln Ala Val Leu Asp					
	85	90	95		
gcc ggg ctt acc tgg atc ggc ccg acc cca cag gcg atc cgc gac ctg					336
Ala Gly Leu Thr Trp Ile Gly Pro Thr Pro Gln Ala Ile Arg Asp Leu					
	100	105	110		
ggc gac aag gtc acc gcc cgg cac atc gcc cag cgg gcc ggc gcg ccc					384
Gly Asp Lys Val Thr Ala Arg His Ile Ala Gln Arg Ala Gly Ala Pro					
	115	120	125		
ctg gtt ccc ggt acc tcg gac ccg gtc ggc agc ccg gac gag gtg atc					432
Leu Val Pro Gly Thr Ser Asp Pro Val Gly Ser Pro Asp Glu Val Ile					
	130	135	140		

gca ttc gcg gtc gac cac ggc ctg ccg gtc gcc atc aag gcc gcc ttc Ala Phe Ala Val Asp His Gly Leu Pro Val Ala Ile Lys Ala Ala Phe 145 150 155 160	480
ggc ggc ggc ggg cgc ggc ctc aag gtg gcc cgc acg atg gag gag atc Gly Gly Gly Gly Arg Gly Leu Lys Val Ala Arg Thr Met Glu Glu Ile 165 170 175	528
ccg cac ctg ttc gag tcg gcc acc cgg gag gcg gtc gcg gcg ttc ggc Pro His Leu Phe Glu Ser Ala Thr Arg Glu Ala Val Ala Ala Phe Gly 180 185 190	576
cgg ggc gag tgt ttc gtc gag cgg tac ctc gac cag ccc cgg cac gtc Arg Gly Glu Cys Phe Val Glu Arg Tyr Leu Asp Gln Pro Arg His Val 195 200 205	624
gag gcc cag gtc ctc gcc gac cag cac ggc aac gtg atc gtc gtc ggc Glu Ala Gln Val Leu Ala Asp Gln His Gly Asn Val Ile Val Val Gly 210 215 220	672
acc cgg gac tgc tcg ctg caa cgc cgg cac cag aaa ctc gtc gag gag Thr Arg Asp Cys Ser Leu Gln Arg Arg His Gln Lys Leu Val Glu Glu 225 230 235 240	720
gcc ccc gcg ccg ttc ctc acc gac gcc cag cgc cgg cag atc cac gac Ala Pro Ala Pro Phe Leu Thr Asp Ala Gln Arg Arg Gln Ile His Asp 245 250 255	768
agc gcc aag gca atc tgc cgg gag gcc ggc tac cac ggc gcc ggc acc Ser Ala Lys Ala Ile Cys Arg Glu Ala Gly Tyr His Gly Ala Gly Thr 260 265 270	816
gtg gag tac ctg gtg ggc acg gac ggc acg atc tcc ttc ctt gag gtc Val Glu Tyr Leu Val Gly Thr Asp Gly Thr Ile Ser Phe Leu Glu Val 275 280 285	864
aac acc cgc ctg cag gtc gag cac ccg gtc acc gag gaa acc gcc ggc Asn Thr Arg Leu Gln Val Glu His Pro Val Thr Glu Glu Thr Ala Gly 290 295 300	912
atc gac ctc gtc cgc gag cag ttc cgg atc gcc gac ggc gag aag ctg Ile Asp Leu Val Arg Glu Gln Phe Arg Ile Ala Asp Gly Glu Lys Leu 305 310 315 320	960
cgg ctg gcc gag gat ccg acc ccg cgc ggg cac tcc atc gag ttc cgg Arg Leu Ala Glu Asp Pro Thr Pro Arg Gly His Ser Ile Glu Phe Arg 325 330 335	1008
atc aac ggc gag gat ccg ggc cgc aac ttc ctg ccc gcc ccc ggc acc Ile Asn Gly Glu Asp Pro Gly Arg Asn Phe Leu Pro Ala Pro Gly Thr 340 345 350	1056
gtc acc gcg ctg cgg ctg ccc acc ggc ccc ggt gtc cgg gtg gac acc Val Thr Ala Leu Arg Leu Pro Thr Gly Pro Gly Val Arg Val Asp Thr 355 360 365	1104
ggc atc tcc gcc ggc gac gtg atc ggc ggc aac ttc gac tcc ctg ctg Gly Ile Ser Ala Gly Asp Val Ile Gly Gly Asn Phe Asp Ser Leu Leu 370 375 380	1152
gcc aag gtg atc atc acg ggc gag acc cgc acc gag gcc ctg gag cgg Ala Lys Val Ile Ile Thr Gly Glu Thr Arg Thr Glu Ala Leu Glu Arg 385 390 395 400	1200
gcc cgg cgg gcg ctg gac gag atg gtc gtc gag gga atg gcc acg gcg	1248

Ala	Arg	Arg	Ala	Leu	Asp	Glu	Met	Val	Val	Glu	Gly	Met	Ala	Thr	Ala	
				405					410					415		
ctg	ccg	ttc	cac	cgc	ctg	gtg	gta	cgc	gac	ccc	gcg	ttc	acc	gcc	gcg	1296
Leu	Pro	Phe	His	Arg	Leu	Val	Val	Arg	Asp	Pro	Ala	Phe	Thr	Ala	Ala	
			420					425					430			
ccg	ttc	acc	gtg	cac	acc	cgg	tgg	atc	gag	acg	gag	ttc	gac	aac	acc	1344
Pro	Phe	Thr	Val	His	Thr	Arg	Trp	Ile	Glu	Thr	Glu	Phe	Asp	Asn	Thr	
		435					440					445				
gtc	ctg	ccg	ttc	acc	gcc	gcc	gcc	ggc	ccc	gcc	gag	ggc	ccg	gcc	gag	1392
Val	Leu	Pro	Phe	Thr	Ala	Ala	Ala	Gly	Pro	Ala	Glu	Gly	Pro	Ala	Glu	
	450					455					460					
cgg	gag	acc	gtc	gtg	gtc	gag	gtg	ggc	ggc	aag	cgg	ctg	gag	gtg	acc	1440
Arg	Glu	Thr	Val	Val		Glu	Val	Gly	Gly	Lys	Arg	Leu	Glu	Val	Thr	
465					470					475					480	
ctc	ccc	gcc	ggc	ctc	ggc	gcg	ggc	acg	gcc	gcc	ggg	ccc	gcc	gcg	cgg	1488
Leu	Pro	Ala	Gly	Leu	Gly	Ala	Gly	Thr	Ala	Ala	Gly	Pro	Ala	Ala	Arg	
				485					490					495		
aag	ccg	gcc	cgg	cgg	ggc	ggc	ggg	gcc	aag	gcc	ggc	gcg	gcg	gtc	ggc	1536
Lys	Pro	Ala	Arg	Arg	Gly	Gly	Gly	Ala	Lys	Ala	Gly	Ala	Ala	Val	Gly	
			500					505					510			
ggc	gac	gcc	ctc	acc	tct	ccg	atg	cag	ggc	acg	atc	gtg	aag	atc	gcc	1584
Gly	Asp	Ala	Leu	Thr	Ser	Pro	Met	Gln	Gly	Thr	Ile	Val	Lys	Ile	Ala	
		515					520					525				
gtc	gcg	gac	ggg	gac	acc	gtc	gcc	aag	ggc	gac	ctg	gtc	gtc	gtg	ctg	1632
Val	Ala	Asp	Gly	Asp	Thr	Val	Ala	Lys	Gly	Asp	Leu	Val	Val	Val	Leu	
	530					535					540					
gag	gcg	atg	aag	atg	gag	cag	ccg	ctg	cac	gcg	cac	aag	gcg	ggc	acg	1680
Glu	Ala	Met	Lys	Met	Glu	Gln	Pro	Leu	His	Ala	His	Lys	Ala	Gly	Thr	
545					550					555					560	
gtc	ggc	ggg	ctg	tcc	gcc	gag	gtc	ggc	gcg	gtc	ctc	gcc	gcc	ggc	gcc	1728
Val	Gly	Gly	Leu	Ser	Ala	Glu	Val	Gly	Ala	Val	Leu	Ala	Ala	Gly	Ala	
				565					570					575		
ccc	atc	tgc	acc	atc	acc											1746
Pro	Ile	Cys	Thr	Ile	Thr											
			580													

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<400> 93

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Ile	Arg	Ala	Cys	Arg	Asp	Ala	Gly	Leu	Gly	Ser	Val	Ala	Val	Tyr	Ala	
		20					25						30			

Asp	Ser	Asp	Arg	Asp	Ala	Leu	His	Ala	Thr	Leu	Ala	Asp	Glu	Ala	Tyr	
		35					40					45				

Ala	Leu	Gly	Gly	Asp	Thr	Ala	Ala	Glu	Thr	Tyr	Leu	Arg	Ile	Asp	Lys	50	55	60
Leu	Ile	Ala	Val	Ala	Ala	Gln	Ala	Gly	Ala	Asp	Ala	Val	His	Pro	Gly	65	70	75
Tyr	Gly	Phe	Leu	Ala	Glu	Asn	Ala	Asp	Phe	Ala	Gln	Ala	Val	Leu	Asp	85	90	95
Ala	Gly	Leu	Thr	Trp	Ile	Gly	Pro	Thr	Pro	Gln	Ala	Ile	Arg	Asp	Leu	100	105	110
Gly	Asp	Lys	Val	Thr	Ala	Arg	His	Ile	Ala	Gln	Arg	Ala	Gly	Ala	Pro	115	120	125
Leu	Val	Pro	Gly	Thr	Ser	Asp	Pro	Val	Gly	Ser	Pro	Asp	Glu	Val	Ile	130	135	140
Ala	Phe	Ala	Val	Asp	His	Gly	Leu	Pro	Val	Ala	Ile	Lys	Ala	Ala	Phe	145	150	155
Gly	Gly	Gly	Gly	Arg	Gly	Leu	Lys	Val	Ala	Arg	Thr	Met	Glu	Glu	Ile	165	170	175
Pro	His	Leu	Phe	Glu	Ser	Ala	Thr	Arg	Glu	Ala	Val	Ala	Ala	Phe	Gly	180	185	190
Arg	Gly	Glu	Cys	Phe	Val	Glu	Arg	Tyr	Leu	Asp	Gln	Pro	Arg	His	Val	195	200	205
Glu	Ala	Gln	Val	Leu	Ala	Asp	Gln	His	Gly	Asn	Val	Ile	Val	Val	Gly	210	215	220
Thr	Arg	Asp	Cys	Ser	Leu	Gln	Arg	Arg	His	Gln	Lys	Leu	Val	Glu	Glu	225	230	235
Ala	Pro	Ala	Pro	Phe	Leu	Thr	Asp	Ala	Gln	Arg	Arg	Gln	Ile	His	Asp	245	250	255
Ser	Ala	Lys	Ala	Ile	Cys	Arg	Glu	Ala	Gly	Tyr	His	Gly	Ala	Gly	Thr	260	265	270
Val	Glu	Tyr	Leu	Val	Gly	Thr	Asp	Gly	Thr	Ile	Ser	Phe	Leu	Glu	Val	275	280	285
Asn	Thr	Arg	Leu	Gln	Val	Glu	His	Pro	Val	Thr	Glu	Glu	Thr	Ala	Gly	290	295	300
Ile	Asp	Leu	Val	Arg	Glu	Gln	Phe	Arg	Ile	Ala	Asp	Gly	Glu	Lys	Leu	305	310	315
Arg	Leu	Ala	Glu	Asp	Pro	Thr	Pro	Arg	Gly	His	Ser	Ile	Glu	Phe	Arg	325	330	335
Ile	Asn	Gly	Glu	Asp	Pro	Gly	Arg	Asn	Phe	Leu	Pro	Ala	Pro	Gly	Thr	340	345	350
Val	Thr	Ala	Leu	Arg	Leu	Pro	Thr	Gly	Pro	Gly	Val	Arg	Val	Asp	Thr	355	360	365
Gly	Ile	Ser	Ala	Gly	Asp	Val	Ile	Gly	Gly	Asn	Phe	Asp	Ser	Leu	Leu	370	375	380

Ala Lys Val Ile Ile Thr Gly Glu Thr Arg Thr Glu Ala Leu Glu Arg
 385 390 395 400

Ala Arg Arg Ala Leu Asp Glu Met Val Val Glu Gly Met Ala Thr Ala
 405 410 415

Leu Pro Phe His Arg Leu Val Val Arg Asp Pro Ala Phe Thr Ala Ala
 420 425 430

Pro Phe Thr Val His Thr Arg Trp Ile Glu Thr Glu Phe Asp Asn Thr
 435 440 445

Val Leu Pro Phe Thr Ala Ala Ala Gly Pro Ala Glu Gly Pro Ala Glu
 450 455 460

Arg Glu Thr Val Val Val Glu Val Gly Gly Lys Arg Leu Glu Val Thr
 465 470 475 480

Leu Pro Ala Gly Leu Gly Ala Gly Thr Ala Ala Gly Pro Ala Ala Arg
 485 490 495

Lys Pro Ala Arg Arg Gly Gly Gly Ala Lys Ala Gly Ala Ala Val Gly
 500 505 510

Gly Asp Ala Leu Thr Ser Pro Met Gln Gly Thr Ile Val Lys Ile Ala
 515 520 525

Val Ala Asp Gly Asp Thr Val Ala Lys Gly Asp Leu Val Val Val Leu
 530 535 540

Glu Ala Met Lys Met Glu Gln Pro Leu His Ala His Lys Ala Gly Thr
 545 550 555 560

Val Gly Gly Leu Ser Ala Glu Val Gly Ala Val Leu Ala Ala Gly Ala
 565 570 575

Pro Ile Cys Thr Ile Thr
 580

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 Val Arg Phe Leu His Gly Ala Val Pro Ala His Asp Leu Thr Tyr Asn
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gac gtc ttc atg gcg ccg aac cgc tcc gag gtc ggc tcc cgg ttg gac 96
 Asp Val Phe Met Ala Pro Asn Arg Ser Glu Val Gly Ser Arg Leu Asp
 20 25 30

gtc gac ctg gcc acc tcc gac ggc acg ggc acc acc atc ccg ctg gtg 144
 Val Asp Leu Ala Thr Ser Asp Gly Thr Gly Thr Thr Ile Pro Leu Val
 35 40 45

gtg	gcg	aac	atg	acg	gcg	gtg	gcc	ggc	cgg	cgg	atg	gcc	gag	act	gtc	192
Val	Ala	Asn	Met	Thr	Ala	Val	Ala	Gly	Arg	Arg	Met	Ala	Glu	Thr	Val	
	50					55					60					
gcc	cgg	cgg	ggc	gca	ctc	gcg	gtg	atc	ccg	cag	gac	atc	ccg	atc	gag	240
Ala	Arg	Arg	Gly	Ala	Leu	Ala	Val	Ile	Pro	Gln	Asp	Ile	Pro	Ile	Glu	
65					70					75					80	
gtg	gtg	gcc	aac	gtg	gtc	gcc	tgg	gtc	aag	caa	cgg	cac	ctg	gtg	cac	288
Val	Val	Ala	Asn	Val	Val	Ala	Trp	Val	Lys	Gln	Arg	His	Leu	Val	His	
				85					90					95		
gac	acg	gcg	atc	acg	ctc	ggc	ccc	acc	gac	acc	gtc	ggc	gat	gcc	atc	336
Asp	Thr	Ala	Ile	Thr	Leu	Gly	Pro	Thr	Asp	Thr	Val	Gly	Asp	Ala	Ile	
			100					105					110			
cat	ctg	ctg	ccg	aaa	cgg	tcg	cat	ggc	gcg	gtg	gtg	gtg	gtc	gac	gag	384
His	Leu	Leu	Pro	Lys	Arg	Ser	His	Gly	Ala	Val	Val	Val	Val	Asp	Glu	
		115					120					125				
gcc	ggt	cgg	ccg	ctg	ggc	gtg	gtg	acg	gag	gcg	gac	acc	gtc	ggg	gtg	432
Ala	Gly	Arg	Pro	Leu	Gly	Val	Val	Thr	Glu	Ala	Asp	Thr	Val	Gly	Val	
130						135					140					
gac	cgc	ttc	gcc	cag	ctc	cgc	cac	gtg	atg	tcg	acc	gag	ttg	cac	acg	480
Asp	Arg	Phe	Ala	Gln	Leu	Arg	His	Val	Met	Ser	Thr	Glu	Leu	His	Thr	
145					150					155					160	
gtg	ccg	gcg	gac	gcg	gac	ccg	cgt	acc	gga	ttc	gac	cgg	ctc	tcg	gcg	528
Val	Pro	Ala	Asp	Ala	Asp	Pro	Arg	Thr	Gly	Phe	Asp	Arg	Leu	Ser	Ala	
				165					170					175		
ggc	cgg	cgg	cgg	ctc	gcg	ccg	gtg	gtg	gac	ggc	gac	ggc	cgg	ctc	gtc	576
Gly	Arg	Arg	Arg	Leu	Ala	Pro	Val	Val	Asp	Gly	Asp	Gly	Arg	Leu	Val	
			180					185					190			
ggg	gtg	ttg	acc	cgc	aag	ggc	gcg	ctg	cgc	gcg	acc	ctc	tac	acc	ccg	624
Gly	Val	Leu	Thr	Arg	Lys	Gly	Ala	Leu	Arg	Ala	Thr	Leu	Tyr	Thr	Pro	
		195					200					205				
gcg	gtg	gac	gac	cgg	ggc	cgg	ctg	cgg	atc	gcg	gcg	gcc	gtc	ggc	atc	672
Ala	Val	Asp	Asp	Arg	Gly	Arg	Leu	Arg	Ile	Ala	Ala	Ala	Val	Gly	Ile	
210						215					220					
aac	ggc	gac	gtc	acc	ggc	aag	gcc	gcc	gcg	ctg	ctg	gag	gcc	ggg	gtc	720
Asn	Gly	Asp	Val	Thr	Gly	Lys	Ala	Ala	Ala	Leu	Leu	Glu	Ala	Gly	Val	
225					230					235					240	
gac	gcc	ctg	gtg	gtg	gac	acc	gcg	cac	ggc	cac	cag	gcg	cgg	atg	gtc	768
Asp	Ala	Leu	Val	Val	Asp	Thr	Ala	His	Gly	His	Gln	Ala	Arg	Met	Val	
				245					250					255		
gcc	gcg	ctg	cgg	gcg	gtg	cgc	aag	ctt	cac	ccg	ggc	gtt	ccg	gtc	gcg	816
Ala	Ala	Leu	Arg	Ala	Val	Arg	Lys	Leu	His	Pro	Gly	Val	Pro	Val	Ala	
			260					265					270			
gcc	ggc	aac	gtg	gtc	acc	gcc	gat	ggg	gta	cgc	gac	ctc	gtc	gag	gcc	864
Ala	Gly	Asn	Val	Val	Thr	Ala	Asp	Gly	Val	Arg	Asp	Leu	Val	Glu	Ala	
		275					280					285				
ggc	gcc	gac	atc	gtg	aag	gtg	ggc	gtc	ggg	ccg	ggc	gcg	atg	tgc	acc	912
Gly	Ala	Asp	Ile	Val	Lys	Val	Gly	Val	Gly	Pro	Gly	Ala	Met	Cys	Thr	
290						295					300					

acc cgg atg atg acc ggg gtg ggg cgt ccg cag ttc tcc gcg gtg ctg 960
 Thr Arg Met Met Thr Gly Val Gly Arg Pro Gln Phe Ser Ala Val Leu
 305 310 315 320

gac tgc gcg gcg gcg gcg cgg gac ctc ggc cgg cac gtc tgg gcc gac 1008
 Asp Cys Ala Ala Ala Ala Arg Asp Leu Gly Arg His Val Trp Ala Asp
 325 330 335

ggc ggg gta cgg cac ccg cgc gac gtg gcg ctg gcc ctc gcc gcc ggc 1056
 Gly Gly Val Arg His Pro Arg Asp Val Ala Leu Ala Leu Ala Ala Gly
 340 345 350

gcg tcg aac gtg atg atc ggt tcc tgg ttc gcc ggc acg tac gag tcc 1104
 Ala Ser Asn Val Met Ile Gly Ser Trp Phe Ala Gly Thr Tyr Glu Ser
 355 360 365

ccg ggt gac ctg tac acg gac gcg gac ggc cgg agg tac aag gag agc 1152
 Pro Gly Asp Leu Tyr Thr Asp Ala Asp Gly Arg Arg Tyr Lys Glu Ser
 370 375 380

ttc ggg atg gcc tcg tcg cgg gcg gtc agc gcg cgt acg gcc gag gac 1200
 Phe Gly Met Ala Ser Ser Arg Ala Val Ser Ala Arg Thr Ala Glu Asp
 385 390 395 400

agc gcg ttc gac cgg gcc cgc aag ggg atc ttc gag gag ggc atc tcc 1248
 Ser Ala Phe Asp Arg Ala Arg Lys Gly Ile Phe Glu Glu Gly Ile Ser
 405 410 415

tcg gcc cgg atg tac ctc gac ccg gat cgc ccg ggc gtc gag gac ctg 1296
 Ser Ala Arg Met Tyr Leu Asp Pro Asp Arg Pro Gly Val Glu Asp Leu
 420 425 430

atc gac gag atc atc tcc ggg gta cgc agc gcg tgc acg tac gcg ggc 1344
 Ile Asp Glu Ile Ile Ser Gly Val Arg Ser Ala Cys Thr Tyr Ala Gly
 435 440 445

gcg cgc agc ctg gcg gag ttc gcg gag cgg gcg ctg gtc ggg gtg cag 1392
 Ala Arg Ser Leu Ala Glu Phe Ala Glu Arg Ala Leu Val Gly Val Gln
 450 455 460

agc acg gcc ggc tac acc gag ggg atg ccc cta ccg acg agt tgg 1437
 Ser Thr Ala Gly Tyr Thr Glu Gly Met Pro Leu Pro Thr Ser Trp
 465 470 475

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Val Arg Phe Leu His Gly Ala Val Pro Ala His Asp Leu Thr Tyr Asn
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Asp Val Phe Met Ala Pro Asn Arg Ser Glu Val Gly Ser Arg Leu Asp
 20 25 30

Val Asp Leu Ala Thr Ser Asp Gly Thr Gly Thr Thr Ile Pro Leu Val
 35 40 45

Val Ala Asn Met Thr Ala Val Ala Gly Arg Arg Met Ala Glu Thr Val
 50 55 60

Ala	Arg	Arg	Gly	Ala	Leu	Ala	Val	Ile	Pro	Gln	Asp	Ile	Pro	Ile	Glu	65	70	75	80
Val	Val	Ala	Asn	Val	Val	Ala	Trp	Val	Lys	Gln	Arg	His	Leu	Val	His	85	90	95	
Asp	Thr	Ala	Ile	Thr	Leu	Gly	Pro	Thr	Asp	Thr	Val	Gly	Asp	Ala	Ile	100	105	110	
His	Leu	Leu	Pro	Lys	Arg	Ser	His	Gly	Ala	Val	Val	Val	Val	Asp	Glu	115	120	125	
Ala	Gly	Arg	Pro	Leu	Gly	Val	Val	Thr	Glu	Ala	Asp	Thr	Val	Gly	Val	130	135	140	
Asp	Arg	Phe	Ala	Gln	Leu	Arg	His	Val	Met	Ser	Thr	Glu	Leu	His	Thr	145	150	155	160
Val	Pro	Ala	Asp	Ala	Asp	Pro	Arg	Thr	Gly	Phe	Asp	Arg	Leu	Ser	Ala	165	170	175	
Gly	Arg	Arg	Arg	Leu	Ala	Pro	Val	Val	Asp	Gly	Asp	Gly	Arg	Leu	Val	180	185	190	
Gly	Val	Leu	Thr	Arg	Lys	Gly	Ala	Leu	Arg	Ala	Thr	Leu	Tyr	Thr	Pro	195	200	205	
Ala	Val	Asp	Asp	Arg	Gly	Arg	Leu	Arg	Ile	Ala	Ala	Ala	Val	Gly	Ile	210	215	220	
Asn	Gly	Asp	Val	Thr	Gly	Lys	Ala	Ala	Ala	Leu	Leu	Glu	Ala	Gly	Val	225	230	235	240
Asp	Ala	Leu	Val	Val	Asp	Thr	Ala	His	Gly	His	Gln	Ala	Arg	Met	Val	245	250	255	
Ala	Ala	Leu	Arg	Ala	Val	Arg	Lys	Leu	His	Pro	Gly	Val	Pro	Val	Ala	260	265	270	
Ala	Gly	Asn	Val	Val	Thr	Ala	Asp	Gly	Val	Arg	Asp	Leu	Val	Glu	Ala	275	280	285	
Gly	Ala	Asp	Ile	Val	Lys	Val	Gly	Val	Gly	Pro	Gly	Ala	Met	Cys	Thr	290	295	300	
Thr	Arg	Met	Met	Thr	Gly	Val	Gly	Arg	Pro	Gln	Phe	Ser	Ala	Val	Leu	305	310	315	320
Asp	Cys	Ala	Ala	Ala	Ala	Arg	Asp	Leu	Gly	Arg	His	Val	Trp	Ala	Asp	325	330	335	
Gly	Gly	Val	Arg	His	Pro	Arg	Asp	Val	Ala	Leu	Ala	Leu	Ala	Ala	Gly	340	345	350	
Ala	Ser	Asn	Val	Met	Ile	Gly	Ser	Trp	Phe	Ala	Gly	Thr	Tyr	Glu	Ser	355	360	365	
Pro	Gly	Asp	Leu	Tyr	Thr	Asp	Ala	Asp	Gly	Arg	Arg	Tyr	Lys	Glu	Ser	370	375	380	
Phe	Gly	Met	Ala	Ser	Ser	Arg	Ala	Val	Ser	Ala	Arg	Thr	Ala	Glu	Asp	385	390	395	400
Ser	Ala	Phe	Asp	Arg	Ala	Arg	Lys	Gly	Ile	Phe	Glu	Glu	Gly	Ile	Ser				

				405						410				415		
Ser	Ala	Arg	Met	Tyr	Leu	Asp	Pro	Asp	Arg	Pro	Gly	Val	Glu	Asp	Leu	
			420					425					430			
Ile	Asp	Glu	Ile	Ile	Ser	Gly	Val	Arg	Ser	Ala	Cys	Thr	Tyr	Ala	Gly	
		435					440					445				
Ala	Arg	Ser	Leu	Ala	Glu	Phe	Ala	Glu	Arg	Ala	Leu	Val	Gly	Val	Gln	
	450					455					460					
Ser	Thr	Ala	Gly	Tyr	Thr	Glu	Gly	Met	Pro	Leu	Pro	Thr	Ser	Trp		
465					470					475						

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Met Thr Gly Pro Arg Gly Tyr His His Gly Asp Leu Arg Arg Ala Leu	
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ctc gcc gcc gcc gtc gac gcg atc acc gac gcc ggg ccg gcc gcc ctg	96
Leu Ala Ala Val Asp Ala Ile Thr Asp Ala Gly Pro Ala Ala Leu	
20 25 30	
agc ctg cgc gac ctg gcc cgc cgg gcc ggg gtc tcg cac gcc gcc ccc	144
Ser Leu Arg Asp Leu Ala Arg Arg Ala Gly Val Ser His Ala Ala Pro	
35 40 45	
gcg cac cac ttc ggc gac aag gcg ggg ctg ctc acc gcg ctc gcc gtc	192
Ala His His Phe Gly Asp Lys Ala Gly Leu Leu Thr Ala Leu Ala Val	
50 55 60	
gag gga ttc gac ctg ctg gcc ggg gcg ctg tgc gag gcc ggc gac ctg	240
Glu Gly Phe Asp Leu Leu Ala Gly Ala Leu Cys Glu Ala Gly Asp Leu	
65 70 75 80	
ctc gac gcc ggc gtg gcg tac gtc cgg ttc gcg gtc gac cac cgg gcc	288
Leu Asp Ala Gly Val Ala Tyr Val Arg Phe Ala Val Asp His Arg Ala	
85 90 95	
cac ttc gag gtg atg ttc cgc ccg gag ctc tac cgt cgc gac gac ccc	336
His Phe Glu Val Met Phe Arg Pro Glu Leu Tyr Arg Arg Asp Asp Pro	
100 105 110	
gag gtg aca gcc gcc cgt gat cgg gcc ggc gcg gcg ctg cgg gcc ggg	384
Glu Val Thr Ala Ala Arg Asp Arg Ala Gly Ala Ala Leu Arg Ala Gly	
115 120 125	
gtg gcc gcc ctc ccg cgc cgg gaa acc gac ccg gac cag gag gcg gac	432
Val Ala Ala Leu Pro Arg Arg Glu Thr Asp Pro Asp Gln Glu Ala Asp	
130 135 140	

gcc ctg gcc gcc tgg tcg atc gtg cac ggc ttc gtg aca ctc tgg ctg 480
 Ala Leu Ala Ala Trp Ser Ile Val His Gly Phe Val Thr Leu Trp Leu
 145 150 155 160

gcc ggg gcg ctc ccg ccc ggc acc ggc ccg gac ccg gag gcc gcc gcc 528
 Ala Gly Ala Leu Pro Pro Gly Thr Gly Pro Asp Pro Glu Ala Ala Ala
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cgg acc gtc atc cgt cgc ctc ttc gac 555
 Arg Thr Val Ile Arg Arg Leu Phe Asp
 180 185

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 <213> Micromonospora carbonacea

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 <223> evbF

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 Leu Ala Ala Ala Val Asp Ala Ile Thr Asp Ala Gly Pro Ala Ala Leu
 20 25 30
 Ser Leu Arg Asp Leu Ala Arg Arg Ala Gly Val Ser His Ala Ala Pro
 35 40 45
 Ala His His Phe Gly Asp Lys Ala Gly Leu Leu Thr Ala Leu Ala Val
 50 55 60
 Glu Gly Phe Asp Leu Leu Ala Gly Ala Leu Cys Glu Ala Gly Asp Leu
 65 70 75 80
 Leu Asp Ala Gly Val Ala Tyr Val Arg Phe Ala Val Asp His Arg Ala
 85 90 95
 His Phe Glu Val Met Phe Arg Pro Glu Leu Tyr Arg Arg Asp Asp Pro
 100 105 110
 Glu Val Thr Ala Ala Arg Asp Arg Ala Gly Ala Ala Leu Arg Ala Gly
 115 120 125
 Val Ala Ala Leu Pro Arg Arg Glu Thr Asp Pro Asp Gln Glu Ala Asp
 130 135 140
 Ala Leu Ala Ala Trp Ser Ile Val His Gly Phe Val Thr Leu Trp Leu
 145 150 155 160
 Ala Gly Ala Leu Pro Pro Gly Thr Gly Pro Asp Pro Glu Ala Ala Ala
 165 170 175
 Arg Thr Val Ile Arg Arg Leu Phe Asp
 180 185

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 Met Val Pro Pro Arg Leu Pro His Pro Gly Leu Leu Val Thr Val Thr
 1 5 10 15
 ggc ctg ctg gag ttg gcc gcc gcg gtc gcg ctg ctc gtc ccc gcc acg 96
 Gly Leu Leu Glu Leu Ala Gly Ala Val Ala Leu Leu Val Pro Gly Thr
 20 25 30
 gcg cgg tgg gca gcg gcc ggg ctg ggg ctg ctg ctg ctc gcg atg ttc 144
 Ala Arg Trp Ala Ala Ala Gly Leu Gly Leu Leu Leu Leu Ala Met Phe
 35 40 45
 ccg gcc aac gcc tcg gcc gcc ccg cgc ggg ctg acc ctg gcc gcc ccg 192
 Pro Ala Asn Ala Ser Ala Ala Arg Arg Gly Leu Thr Leu Ala Gly Arg
 50 55 60
 ccg gtg acc ccg ctc gtc ccc cgc gcg ctg ctc cag gtg atc ttc ctc 240
 Pro Val Thr Pro Leu Val Pro Arg Ala Leu Leu Gln Val Ile Phe Leu
 65 70 75 80
 acc gcc gcc gcc gcg att tcg ttt ggg ccc 270
 Thr Ala Ala Ala Ala Ile Ser Phe Gly Pro
 85 90

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 <213> Micromonospora carbonacea

<220>
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 Gly Leu Leu Glu Leu Ala Gly Ala Val Ala Leu Leu Val Pro Gly Thr
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 Ala Arg Trp Ala Ala Ala Gly Leu Gly Leu Leu Leu Leu Ala Met Phe
 35 40 45
 Pro Ala Asn Ala Ser Ala Ala Arg Arg Gly Leu Thr Leu Ala Gly Arg
 50 55 60
 Pro Val Thr Pro Leu Val Pro Arg Ala Leu Leu Gln Val Ile Phe Leu
 65 70 75 80
 Thr Ala Ala Ala Ala Ile Ser Phe Gly Pro
 85 90

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 <212> DNA

<213> Micromonospora carbonacea

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<223> evbF2

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Val Pro Leu Gly Arg Leu Leu Val Thr Ala Gly His Val Val Gly Gln
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cgg tgg aac cgc tac ctc gcc gag gag cac ggc ctc acc cag cgc ggc 96
Arg Trp Asn Arg Tyr Leu Ala Glu Glu His Gly Leu Thr Gln Ala Gly
                20                      25                      30

atg gtc acc ctg atg acc ctg gcc cgg cac ggc gag ctg ccg cac cgg 144
Met Val Thr Leu Met Thr Leu Ala Arg His Gly Glu Leu Pro His Arg
                35                      40                      45

gcg gtc gcc gag gcg tgc ttc atc cgc ccg gcc acc cta acc ggc atc 192
Ala Val Ala Glu Ala Cys Phe Ile Arg Pro Ala Thr Leu Thr Gly Ile
  50                      55                      60

gtc gac aca ctg gag cgc gac ggc ctc gtc gag cgg caa cgc gac gac 240
Val Asp Thr Leu Glu Arg Asp Gly Leu Val Glu Arg Gln Arg Asp Asp
  65                      70                      75                      80

gtc gac cgg cgc agc gtg cgg ctc gtc ctg acc ccc gcc ggt cgg gaa 288
Val Asp Arg Arg Ser Val Arg Leu Val Leu Thr Pro Ala Gly Arg Glu
                85                      90                      95

cgg gtc gcc gcg ctc acc aac gtc atg cag tcc gga cga ccg atg acc 336
Arg Val Ala Ala Leu Thr Asn Val Met Gln Ser Gly Arg Pro Met Thr
                100                      105                      110

tcg gtc gac gcc gac ccg gcg aag gcc gcc gtg atc cgg cag ttc ctg 384
Ser Val Asp Ala Asp Pro Ala Lys Ala Ala Val Ile Arg Gln Phe Leu
                115                      120                      125

ctc gag gtc atc ggc agt gga gag gaa cct cgg gtg acg gcc ctc gac 432
Leu Glu Val Ile Gly Ser Gly Glu Glu Pro Arg Val Thr Ala Leu Asp
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gcg agg ccg gag gct ccg gca tgc 456
Ala Arg Pro Glu Ala Pro Ala Cys
145                      150

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<210> 101

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<212> PRT

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<220>

<223> evbF2

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Val Pro Leu Gly Arg Leu Leu Val Thr Ala Gly His Val Val Gly Gln
  1                      5                      10                      15

Arg Trp Asn Arg Tyr Leu Ala Glu Glu His Gly Leu Thr Gln Ala Gly
                20                      25                      30

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Met Val Thr Leu Met Thr Leu Ala Arg His Gly Glu Leu Pro His Arg
 35 40 45

Ala Val Ala Glu Ala Cys Phe Ile Arg Pro Ala Thr Leu Thr Gly Ile
 50 55 60

Val Asp Thr Leu Glu Arg Asp Gly Leu Val Glu Arg Gln Arg Asp Asp
 65 70 75 80

Val Asp Arg Arg Ser Val Arg Leu Val Leu Thr Pro Ala Gly Arg Glu
 85 90 95

Arg Val Ala Ala Leu Thr Asn Val Met Gln Ser Gly Arg Pro Met Thr
 100 105 110

Ser Val Asp Ala Asp Pro Ala Lys Ala Ala Val Ile Arg Gln Phe Leu
 115 120 125

Leu Glu Val Ile Gly Ser Gly Glu Glu Pro Arg Val Thr Ala Leu Asp
 130 135 140

Ala Arg Pro Glu Ala Pro Ala Cys
 145 150

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 <212> DNA
 <213> Micromonospora carbonacea

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 <222> (1)..(1671)

<220>
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 Met Ala Leu Gln Phe Val Gly Thr Met Ala Ser Leu Tyr Leu Pro Ser
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ctc aac gcc gac atc atc gac cag ggt gtg gcc cgg ggc gac acc ggc 96
 Leu Asn Ala Asp Ile Ile Asp Gln Gly Val Ala Arg Gly Asp Thr Gly
 20 25 30

tac atc atg cgt acg ggc ggc tgg atg ctg ctg gtc agc ctg gtg cag 144
 Tyr Ile Met Arg Thr Gly Gly Trp Met Leu Leu Val Ser Leu Val Gln
 35 40 45

atc gcc tgc tcc acc gcc gcg gtc ttc ctc ggc gcg cgc tcc gcg atg 192
 Ile Ala Cys Ser Thr Ala Ala Val Phe Leu Gly Ala Arg Ser Ala Met
 50 55 60

ggc ttc ggc cgg gac gta cgc gcc gag gtc ttc gcc cac gtc aac cgg 240
 Gly Phe Gly Arg Asp Val Arg Ala Glu Val Phe Ala His Val Asn Arg
 65 70 75 80

ttc tcc gcc cgc gag gtg acc cgc ttc ggc gca ccc tcg ctg atc acc 288
 Phe Ser Ala Arg Glu Val Thr Arg Phe Gly Ala Pro Ser Leu Ile Thr
 85 90 95

cgc aac acc aac gac gtg caa cag gtg cag atg ctc gtc ctg atg agc 336

Arg	Asn	Thr	Asn	Asp	Val	Gln	Gln	Val	Gln	Met	Leu	Val	Leu	Met	Ser	
			100					105					110			
tgc	acc	atg	ctg	gtc	gcc	gcg	ccg	atc	atg	agc	gtc	ggc	ggg	gtg	ttc	384
Cys	Thr	Met	Leu	Val	Ala	Ala	Pro	Ile	Met	Ser	Val	Gly	Gly	Val	Phe	
		115					120					125				
atg	gca	ctg	cgg	gag	gac	gtc	ggg	ctg	tcc	tgg	ctg	atg	ctg	gtc	agc	432
Met	Ala	Leu	Arg	Glu	Asp	Val	Gly	Leu	Ser	Trp	Leu	Met	Leu	Val	Ser	
	130					135					140					
gtg	ccg	gcg	ctg	gcg	atc	gcc	ctg	atg	ctg	atc	atc	cgg	cgg	atg	gtg	480
Val	Pro	Ala	Leu	Ala	Ile	Ala	Leu	Met	Leu	Ile	Ile	Arg	Arg	Met	Val	
145					150					155					160	
ccc	ggg	ttc	cgg	ctg	atg	cag	acc	cgc	atc	gac	gcg	gtc	aac	cgc	gtg	528
Pro	Gly	Phe	Arg	Leu	Met	Gln	Thr	Arg	Ile	Asp	Ala	Val	Asn	Arg	Val	
				165				170						175		
ctg	cgc	gag	cag	atc	acc	ggc	atc	cgg	gtg	gtc	cgg	gcg	ttc	gtc	cgc	576
Leu	Arg	Glu	Gln	Ile	Thr	Gly	Ile	Arg	Val	Val	Arg	Ala	Phe	Val	Arg	
			180					185					190			
gag	ccg	tac	gag	acg	gcg	cgc	ttc	ggc	cgc	gcg	aac	gcc	gac	ctc	acc	624
Glu	Pro	Tyr	Glu	Thr	Ala	Arg	Phe	Gly	Arg	Ala	Asn	Ala	Asp	Leu	Thr	
		195					200					205				
gcg	acc	gcc	ctg	cgc	acc	ggc	cgg	ttg	atg	gcc	ctg	atc	ttc	ccc	gtg	672
Ala	Thr	Ala	Leu	Arg	Thr	Gly	Arg	Leu	Met	Ala	Leu	Ile	Phe	Pro	Val	
	210					215					220					
gtg	acg	ctg	gtg	ctc	aac	gtc	tcc	agc	gtc	gcc	gtg	ctg	tgg	ttc	ggc	720
Val	Thr	Leu	Val	Leu	Asn	Val	Ser	Ser	Val	Ala	Val	Leu	Trp	Phe	Gly	
225					230					235					240	
gcg	gac	cgc	gtc	gac	gcc	ggc	cag	atc	cag	gtc	ggc	gcg	ctc	acc	gcc	768
Ala	Asp	Arg	Val	Asp	Ala	Gly	Gln	Ile	Gln	Val	Gly	Ala	Leu	Thr	Ala	
				245					250					255		
ttc	ctg	cag	tac	ctc	atg	cag	atc	ctg	atg	gcc	gtc	atg	ttg	gcc	acc	816
Phe	Leu	Gln	Tyr	Leu	Met	Gln	Ile	Leu	Met	Ala	Val	Met	Leu	Ala	Thr	
			260					265					270			
ttc	atc	ctg	atg	atg	gtc	ccg	cgc	gcc	gcg	gtc	tgc	gcc	gag	cgg	atc	864
Phe	Ile	Leu	Met	Met	Val	Pro	Arg	Ala	Ala	Val	Cys	Ala	Glu	Arg	Ile	
		275					280					285				
gtc	gag	gtg	ctc	gac	acc	gac	tgc	acg	gtg	atc	ccg	ccg	gcc	gcg	ccg	912
Val	Glu	Val	Leu	Asp	Thr	Asp	Ser	Thr	Val	Ile	Pro	Pro	Ala	Ala	Pro	
	290					295					300					
acg	gcc	gag	gtg	acc	ggc	cgg	ggc	gaa	ctg	gaa	ctg	cgc	ggc	gtc	cgg	960
Thr	Ala	Glu	Val	Thr	Gly	Arg	Gly	Glu	Leu	Glu	Leu	Arg	Gly	Val	Arg	
	305				310					315					320	
ttc	cag	tac	ccg	ggg	gcg	agc	gcg	ccg	gtg	ctg	cac	gac	atc	tgc	ttc	1008
Phe	Gln	Tyr	Pro	Gly	Ala	Ser	Ala	Pro	Val	Leu	His	Asp	Ile	Ser	Phe	
				325					330				335			
cgg	gcc	acg	ccc	ggg	cgc	acc	acg	gcc	atc	atc	ggc	agc	acg	ggg	gcc	1056
Arg	Ala	Thr	Pro	Gly	Arg	Thr	Thr	Ala	Ile	Ile	Gly	Ser	Thr	Gly	Ala	
			340					345					350			
ggc	aag	acg	acc	ctg	ctg	acg	ctg	atc	ccc	cgg	ctg	atc	gac	gcc	acc	1104
Gly	Lys	Thr	Thr	Leu	Leu	Thr	Leu	Ile	Pro	Arg	Leu	Ile	Asp	Ala	Thr	

355					360					365						
gcc	ggg	gcg	gtg	ctg	gtc	gac	ggg	gtg	gac	gtg	cgt	gac	ctg	gcc	ccg	1152
Ala	Gly	Ala	Val	Leu	Val	Asp	Gly	Val	Asp	Val	Arg	Asp	Leu	Ala	Pro	
	370					375					380					
gac	gat	ttg	tgg	cgg	cgg	atc	ggg	ctg	gtg	ccg	cag	cgg	ccg	tac	ctg	1200
Asp	Asp	Leu	Trp	Arg	Arg	Ile	Gly	Leu	Val	Pro	Gln	Arg	Pro	Tyr	Leu	
	385				390					395					400	
ttc	agc	ggc	acg	atc	gcc	agc	aac	ctg	cgg	tac	ggc	aac	ccg	gac	gcc	1248
Phe	Ser	Gly	Thr	Ile	Ala	Ser	Asn	Leu	Arg	Tyr	Gly	Asn	Pro	Asp	Ala	
				405				410						415		
acc	gac	gcg	gag	ctg	tgg	gcc	gcc	ctg	gag	atc	gcc	cag	gcg	cgc	gac	1296
Thr	Asp	Ala	Glu	Leu	Trp	Ala	Ala	Leu	Glu	Ile	Ala	Gln	Ala	Arg	Asp	
			420					425					430			
ttc	gtc	gcc	gag	ttg	ccc	gaa	ggg	ctg	aac	gcc	ccg	atc	acg	cag	ggc	1344
Phe	Val	Ala	Glu	Leu	Pro	Glu	Gly	Leu	Asn	Ala	Pro	Ile	Thr	Gln	Gly	
		435					440					445				
ggc	acc	aat	atc	tcc	ggc	ggg	cag	cgc	cag	cgc	ctc	gcg	atc	gcc	cgg	1392
Gly	Thr	Asn	Ile	Ser	Gly	Gly	Gln	Arg	Gln	Arg	Leu	Ala	Ile	Ala	Arg	
	450					455					460					
gcc	ctg	gtc	cgc	aag	ccg	gag	atc	tac	ctg	ttc	gac	gac	tcg	ttc	tcg	1440
Ala	Leu	Val	Arg	Lys	Pro	Glu	Ile	Tyr	Leu	Phe	Asp	Asp	Ser	Phe	Ser	
	465				470					475					480	
gcg	ctc	gac	ctg	ggc	acc	gac	gcc	cgg	ctg	cgc	gcg	gcg	cta	cga	ccg	1488
Ala	Leu	Asp	Leu	Gly	Thr	Asp	Ala	Arg	Leu	Arg	Ala	Ala	Leu	Arg	Pro	
				485					490					495		
gtc	acc	gcg	gac	gcg	acg	gtg	ctg	atc	gtg	gcc	cag	cgg	gtc	tcc	acg	1536
Val	Thr	Ala	Asp	Ala	Thr	Val	Leu	Ile	Val	Ala	Gln	Arg	Val	Ser	Thr	
			500					505					510			
atc	gtc	gac	gcc	gac	cag	atc	atc	gtg	ctt	gag	gac	ggg	ggc	atc	gtc	1584
Ile	Val	Asp	Ala	Asp	Gln	Ile	Ile	Val	Leu	Glu	Asp	Gly	Gly	Ile	Val	
		515				520						525				
ggg	atg	ggc	cga	cac	gcc	gaa	cta	ctg	gaa	gac	tgc	ccg	acg	tac	gcg	1632
Gly	Met	Gly	Arg	His	Ala	Glu	Leu	Leu	Glu	Asp	Cys	Pro	Thr	Tyr	Ala	
	530					535					540					
gag	atc	gtc	gcc	tcc	cag	cag	acg	gcg	ggg	gtg	ccg	gca				1671
Glu	Ile	Val	Ala	Ser	Gln	Gln	Thr	Ala	Gly	Val	Pro	Ala				
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Leu	Asn	Ala	Asp	Ile	Ile	Asp	Gln	Gly	Val	Ala	Arg	Gly	Asp	Thr	Gly	
			20					25					30			

Tyr	Ile	Met	Arg	Thr	Gly	Gly	Trp	Met	Leu	Leu	Val	Ser	Leu	Val	Gln	35	40	45
Ile	Ala	Cys	Ser	Thr	Ala	Ala	Val	Phe	Leu	Gly	Ala	Arg	Ser	Ala	Met	50	55	60
Gly	Phe	Gly	Arg	Asp	Val	Arg	Ala	Glu	Val	Phe	Ala	His	Val	Asn	Arg	65	70	75
Phe	Ser	Ala	Arg	Glu	Val	Thr	Arg	Phe	Gly	Ala	Pro	Ser	Leu	Ile	Thr	85	90	95
Arg	Asn	Thr	Asn	Asp	Val	Gln	Gln	Val	Gln	Met	Leu	Val	Leu	Met	Ser	100	105	110
Cys	Thr	Met	Leu	Val	Ala	Ala	Pro	Ile	Met	Ser	Val	Gly	Gly	Val	Phe	115	120	125
Met	Ala	Leu	Arg	Glu	Asp	Val	Gly	Leu	Ser	Trp	Leu	Met	Leu	Val	Ser	130	135	140
Val	Pro	Ala	Leu	Ala	Ile	Ala	Leu	Met	Leu	Ile	Ile	Arg	Arg	Met	Val	145	150	155
Pro	Gly	Phe	Arg	Leu	Met	Gln	Thr	Arg	Ile	Asp	Ala	Val	Asn	Arg	Val	165	170	175
Leu	Arg	Glu	Gln	Ile	Thr	Gly	Ile	Arg	Val	Val	Arg	Ala	Phe	Val	Arg	180	185	190
Glu	Pro	Tyr	Glu	Thr	Ala	Arg	Phe	Gly	Arg	Ala	Asn	Ala	Asp	Leu	Thr	195	200	205
Ala	Thr	Ala	Leu	Arg	Thr	Gly	Arg	Leu	Met	Ala	Leu	Ile	Phe	Pro	Val	210	215	220
Val	Thr	Leu	Val	Leu	Asn	Val	Ser	Ser	Val	Ala	Val	Leu	Trp	Phe	Gly	225	230	235
Ala	Asp	Arg	Val	Asp	Ala	Gly	Gln	Ile	Gln	Val	Gly	Ala	Leu	Thr	Ala	245	250	255
Phe	Leu	Gln	Tyr	Leu	Met	Gln	Ile	Leu	Met	Ala	Val	Met	Leu	Ala	Thr	260	265	270
Phe	Ile	Leu	Met	Met	Val	Pro	Arg	Ala	Ala	Val	Cys	Ala	Glu	Arg	Ile	275	280	285
Val	Glu	Val	Leu	Asp	Thr	Asp	Ser	Thr	Val	Ile	Pro	Pro	Ala	Ala	Pro	290	295	300
Thr	Ala	Glu	Val	Thr	Gly	Arg	Gly	Glu	Leu	Glu	Leu	Arg	Gly	Val	Arg	305	310	315
Phe	Gln	Tyr	Pro	Gly	Ala	Ser	Ala	Pro	Val	Leu	His	Asp	Ile	Ser	Phe	325	330	335
Arg	Ala	Thr	Pro	Gly	Arg	Thr	Thr	Ala	Ile	Ile	Gly	Ser	Thr	Gly	Ala	340	345	350
Gly	Lys	Thr	Thr	Leu	Leu	Thr	Leu	Ile	Pro	Arg	Leu	Ile	Asp	Ala	Thr	355	360	365
Ala	Gly	Ala	Val	Leu	Val	Asp	Gly	Val	Asp	Val	Arg	Asp	Leu	Ala	Pro			

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<222> (1) .. (1935)
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Met	Ser	Ala	Gly	Met	Pro	Ala	Glu	Lys	Ser	Met	Asn	Phe	Gly	Pro	Ser	
1				5				10				15				
acc	cgc	cgg	ctg	ctg	cgc	cgg	ctg	cga	ccg	cac	cgc	ctc	cag	ctg	gcc	96
Thr	Arg	Arg	Leu	Leu	Arg	Arg	Leu	Arg	Pro	His	Arg	Leu	Gln	Leu	Ala	
				20				25				30				
gcc	atc	gtc	ctg	ctc	tcg	ctg	gtc	agc	gtc	ggg	tgc	aac	gtg	tac	ggg	144
Ala	Ile	Val	Leu	Leu	Ser	Leu	Val	Ser	Val	Gly	Cys	Asn	Val	Tyr	Gly	
35				40				45								
ccg	aag	gtg	ctc	ggc	cac	gcc	acc	gac	ctg	atc	ttc	agc	ggg	gtg	atc	192
Pro	Lys	Val	Leu	Gly	His	Ala	Thr	Asp	Leu	Ile	Phe	Ser	Gly	Val	Ile	
50				55				60								

ggc	cgg	cag	ttg	ccg	gcc	ggc	acc	acc	gcc	gag	cag	gcg	gtc	gcg	gcg	240
Gly	Arg	Gln	Leu	Pro	Ala	Gly	Thr	Thr	Ala	Glu	Gln	Ala	Val	Ala	Ala	
65					70					75					80	
gcc	cgc	gcg	gcc	ggg	aac	gac	agc	ttc	gcc	gac	atg	ctg	gcc	cgg	atg	288
Ala	Arg	Ala	Ala	Gly	Asn	Asp	Ser	Phe	Ala	Asp	Met	Leu	Ala	Arg	Met	
				85					90					95		
gac	gtg	gtg	ccc	ggg	gtg	ggc	atc	gac	ttc	acc	gcc	ctg	ggc	cgg	gtg	336
Asp	Val	Val	Pro	Gly	Val	Gly	Ile	Asp	Phe	Thr	Ala	Leu	Gly	Arg	Val	
			100					105					110			
ctg	ctg	ttc	gtg	ctc	gcc	ctc	tac	ctg	gcg	gcc	agc	gtg	ctg	ttg	tgg	384
Leu	Leu	Phe	Val	Leu	Ala	Leu	Tyr	Leu	Ala	Ala	Ser	Val	Leu	Leu	Trp	
		115					120					125				
tgg	cag	ggc	tgg	ctg	ctc	aac	ggg	gtg	gtg	cag	cgc	acg	gtg	ctg	cgg	432
Trp	Gln	Gly	Trp	Leu	Leu	Asn	Gly	Val	Val	Gln	Arg	Thr	Val	Leu	Arg	
	130					135					140					
ctg	cgc	gcc	gac	gtg	gag	gac	aag	ctg	aac	cgg	ctg	ccg	ctg	ccg	tac	480
Leu	Arg	Ala	Asp	Val	Glu	Asp	Lys	Leu	Asn	Arg	Leu	Pro	Leu	Pro	Tyr	
145					150					155					160	
ttc	gac	cgg	cag	ccc	cgg	ggc	gag	ttg	ctc	agc	cgg	gtc	acc	aac	gac	528
Phe	Asp	Arg	Gln	Pro	Arg	Gly	Glu	Leu	Leu	Ser	Arg	Val	Thr	Asn	Asp	
				165					170					175		
atc	gac	aac	atc	tcg	cag	agc	ctc	cag	cag	acg	ctg	agc	cag	ctg	ctc	576
Ile	Asp	Asn	Ile	Ser	Gln	Ser	Leu	Gln	Gln	Thr	Leu	Ser	Gln	Leu	Leu	
			180					185					190			
acc	tcg	ctg	ctc	acc	gtg	gtc	ggc	gta	ctg	gcc	atg	atg	ttc	tgg	atc	624
Thr	Ser	Leu	Leu	Thr	Val	Val	Gly	Val	Leu	Ala	Met	Met	Phe	Trp	Ile	
		195					200					205				
tcg	ccg	ctg	ttg	gcg	ctg	gtg	tcc	ctg	gtc	gcg	gtg	ccg	atg	tcg	gtg	672
Ser	Pro	Leu	Leu	Ala	Leu	Val	Ser	Leu	Val	Ala	Val	Pro	Met	Ser	Val	
	210					215					220					
gtg	gtc	acc	agc	ctg	gtc	gcg	aag	cgg	tca	cag	cag	cgg	ttc	atc	gcc	720
Val	Val	Thr	Ser	Leu	Val	Ala	Lys	Arg	Ser	Gln	Gln	Arg	Phe	Ile	Ala	
225					230					235					240	
cag	tgg	acg	cat	acc	gga	gag	ctg	aac	ggc	cag	atc	gag	gag	gcg	ttc	768
Gln	Trp	Thr	His	Thr	Gly	Glu	Leu	Asn	Gly	Gln	Ile	Glu	Glu	Ala	Phe	
				245					250					255		
acc	gga	cac	gag	ctg	gtc	aag	gtc	ttc	ggc	cgg	cag	cgc	gag	gtg	gag	816
Thr	Gly	His	Glu	Leu	Val	Lys	Val	Phe	Gly	Arg	Gln	Arg	Glu	Val	Glu	
			260					265					270			
gcc	gcc	ttc	acc	gcc	aag	aac	gag	gag	ctg	ttc	cgg	gcc	agc	ttc	ggc	864
Ala	Ala	Phe	Thr	Ala	Lys	Asn	Glu	Glu	Leu	Phe	Arg	Ala	Ser	Phe	Gly	
		275					280					285				
gcc	cag	ttc	atc	tcc	ggg	atc	atc	atg	ccg	gcg	atg	atg	ttc	atc	ggg	912
Ala	Gln	Phe	Ile	Ser	Gly	Ile	Ile	Met	Pro	Ala	Met	Met	Phe	Ile	Gly	
	290					295					300					
aac	ctc	agc	tac	gtc	gcg	atc	gcc	gtg	gtc	ggc	ggg	ctg	cgg	gtg	gcg	960
Asn	Leu	Ser	Tyr	Val	Ala	Ile	Ala	Val	Val	Gly	Gly	Leu	Arg	Val	Ala	
305					310					315					320	

tcg ggg tcg atg agc atc ggc gac gtg cag gca ttc atc cag tac tcc	1008
Ser Gly Ser Met Ser Ile Gly Asp Val Gln Ala Phe Ile Gln Tyr Ser	
325 330 335	
ctc cag ttc acc cag ccg ctg acc cgg gtc gcc tcg atg gcc aac ctg	1056
Leu Gln Phe Thr Gln Pro Leu Thr Arg Val Ala Ser Met Ala Asn Leu	
340 345 350	
ctc cag tcc ggg gtg gcc tcc gcc gag cgg gtg ttc gcg gtg ctc gac	1104
Leu Gln Ser Gly Val Ala Ser Ala Glu Arg Val Phe Ala Val Leu Asp	
355 360 365	
gcc gag gag cag agc ccg gac ccg gcg gtg ccg gcc cgg gtc gcc gac	1152
Ala Glu Glu Gln Ser Pro Asp Pro Ala Val Pro Ala Arg Val Ala Asp	
370 375 380	
cag cgc ggt cgc gtc gaa ttc gac cac gtc tca ttc cgg tac gag ccg	1200
Gln Arg Gly Arg Val Glu Phe Asp His Val Ser Phe Arg Tyr Glu Pro	
385 390 395 400	
gac aag ccg ctg atc acc gac ctg tcg ctg gtc gcc gag ccg ggg cac	1248
Asp Lys Pro Leu Ile Thr Asp Leu Ser Leu Val Ala Glu Pro Gly His	
405 410 415	
acg gtt gcc atc gtc ggg ccg acc ggc gcc ggc aag acc acc ctg gtc	1296
Thr Val Ala Ile Val Gly Pro Thr Gly Ala Gly Lys Thr Thr Leu Val	
420 425 430	
aac ctg gtg atg cgc ttc tac gag ctg gac gcc ggc cgg atc acc ctc	1344
Asn Leu Val Met Arg Phe Tyr Glu Leu Asp Ala Gly Arg Ile Thr Leu	
435 440 445	
gac ggg gtc gac atc acc acg ctg agc cgc gac gac ctg cgc ggc cgg	1392
Asp Gly Val Asp Ile Thr Thr Leu Ser Arg Asp Asp Leu Arg Gly Arg	
450 455 460	
atc ggc atg gtg ctc cag gac acc tgg ctc ttc ggt ggc acg atc cgc	1440
Ile Gly Met Val Leu Gln Asp Thr Trp Leu Phe Gly Gly Thr Ile Arg	
465 470 475 480	
gac aac atc gcg tac ggc cgg ccg gac gcg agc gag gag gag atc gtc	1488
Asp Asn Ile Ala Tyr Gly Arg Pro Asp Ala Ser Glu Glu Glu Ile Val	
485 490 495	
gcc gcc gcc cgg gcg acg ttc gtg gac cgg ttc gtg cgt agc ctc ccc	1536
Ala Ala Ala Arg Ala Thr Phe Val Asp Arg Phe Val Arg Ser Leu Pro	
500 505 510	
gac ggc tac gac acc gtc atc gac tcc gag ggc agc aac gtc agc gcc	1584
Asp Gly Tyr Asp Thr Val Ile Asp Ser Glu Gly Ser Asn Val Ser Ala	
515 520 525	
ggc gag aag cag ctc atc acc atc gcc cgg gcg ttc ctg gcc gag ccg	1632
Gly Glu Lys Gln Leu Ile Thr Ile Ala Arg Ala Phe Leu Ala Glu Pro	
530 535 540	
tcg ctg ctg atc ctc gac gag gcg acc agt tcg gtg gac acc cgc acg	1680
Ser Leu Leu Ile Leu Asp Glu Ala Thr Ser Val Asp Thr Arg Thr	
545 550 555 560	
gag gtg ctg ctc caa cgg gcc atg gcg gcg ctg cgc tcg gac cgg acc	1728
Glu Val Leu Leu Gln Arg Ala Met Ala Ala Leu Arg Ser Asp Arg Thr	
565 570 575	
agc ttc gtc atc gcc cac cgt ttg tcc acc atc cgc gac gcg gac ctg	1776

Ser	Phe	Val	Ile	Ala	His	Arg	Leu	Ser	Thr	Ile	Arg	Asp	Ala	Asp	Leu	
			580					585					590			
atc	ctg	atg	atg	gag	cac	ggg	cgc	atc	gtc	gag	cag	ggc	acc	cac	gag	1824
Ile	Leu	Met	Met	Glu	His	Gly	Arg	Ile	Val	Glu	Gln	Gly	Thr	His	Glu	
		595					600					605				
cag	ctc	ctg	gcc	gcc	cgg	ggc	gcg	tac	cac	cgg	ctt	tac	cag	gcc	cag	1872
Gln	Leu	Leu	Ala	Ala	Arg	Gly	Ala	Tyr	His	Arg	Leu	Tyr	Gln	Ala	Gln	
		610				615					620					
ttc	acc	cag	ccg	gac	ccg	gcc	gcc	gtc	ggg	gac	ccc	gag	ccc	cag	ccc	1920
Phe	Thr	Gln	Pro	Asp	Pro	Ala	Ala	Val	Gly	Asp	Pro	Glu	Pro	Gln	Pro	
625					630					635					640	
gcc	tcg	gtc	cgg	ggc												1935
Ala	Ser	Val	Arg	Gly												
				645												

<210> 105

<211> 645

<212> PRT

<213> Micromonospora carbonacea

<220>

<223> evbH

<400> 105

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Thr	Arg	Arg	Leu	Leu	Arg	Arg	Leu	Arg	Pro	His	Arg	Leu	Gln	Leu	Ala	
			20					25					30			
Ala	Ile	Val	Leu	Leu	Ser	Leu	Val	Ser	Val	Gly	Cys	Asn	Val	Tyr	Gly	
		35					40					45				
Pro	Lys	Val	Leu	Gly	His	Ala	Thr	Asp	Leu	Ile	Phe	Ser	Gly	Val	Ile	
	50					55					60					
Gly	Arg	Gln	Leu	Pro	Ala	Gly	Thr	Thr	Ala	Glu	Gln	Ala	Val	Ala	Ala	
65					70					75					80	
Ala	Arg	Ala	Ala	Gly	Asn	Asp	Ser	Phe	Ala	Asp	Met	Leu	Ala	Arg	Met	
				85					90					95		
Asp	Val	Val	Pro	Gly	Val	Gly	Ile	Asp	Phe	Thr	Ala	Leu	Gly	Arg	Val	
			100					105					110			
Leu	Leu	Phe	Val	Leu	Ala	Leu	Tyr	Leu	Ala	Ala	Ser	Val	Leu	Leu	Trp	
		115					120					125				
Trp	Gln	Gly	Trp	Leu	Leu	Asn	Gly	Val	Val	Gln	Arg	Thr	Val	Leu	Arg	
	130					135					140					
Leu	Arg	Ala	Asp	Val	Glu	Asp	Lys	Leu	Asn	Arg	Leu	Pro	Leu	Pro	Tyr	
145					150					155					160	
Phe	Asp	Arg	Gln	Pro	Arg	Gly	Glu	Leu	Leu	Ser	Arg	Val	Thr	Asn	Asp	
			165						170					175		
Ile	Asp	Asn	Ile	Ser	Gln	Ser	Leu	Gln	Gln	Thr	Leu	Ser	Gln	Leu	Leu	
			180					185					190			

Thr	Ser	Leu 195	Leu	Thr	Val	Val	Gly 200	Val	Leu	Ala	Met	Met 205	Phe	Trp	Ile
Ser	Pro 210	Leu	Leu	Ala	Leu	Val 215	Ser	Leu	Val	Ala	Val 220	Pro	Met	Ser	Val
Val 225	Val	Thr	Ser	Leu	Val 230	Ala	Lys	Arg	Ser	Gln 235	Gln	Arg	Phe	Ile	Ala 240
Gln	Trp	Thr	His	Thr 245	Gly	Glu	Leu	Asn	Gly 250	Gln	Ile	Glu	Glu	Ala 255	Phe
Thr	Gly	His	Glu 260	Leu	Val	Lys	Val	Phe 265	Gly	Arg	Gln	Arg	Glu 270	Val	Glu
Ala	Ala	Phe 275	Thr	Ala	Lys	Asn	Glu 280	Glu	Leu	Phe	Arg	Ala 285	Ser	Phe	Gly
Ala	Gln 290	Phe	Ile	Ser	Gly	Ile 295	Ile	Met	Pro	Ala	Met 300	Met	Phe	Ile	Gly
Asn 305	Leu	Ser	Tyr	Val	Ala 310	Ile	Ala	Val	Val	Gly 315	Gly	Leu	Arg	Val	Ala 320
Ser	Gly	Ser	Met	Ser 325	Ile	Gly	Asp	Val	Gln 330	Ala	Phe	Ile	Gln	Tyr 335	Ser
Leu	Gln	Phe	Thr 340	Gln	Pro	Leu	Thr	Arg 345	Val	Ala	Ser	Met	Ala 350	Asn	Leu
Leu	Gln	Ser 355	Gly	Val	Ala	Ser	Ala 360	Glu	Arg	Val	Phe	Ala 365	Val	Leu	Asp
Ala	Glu 370	Glu	Gln	Ser	Pro	Asp 375	Pro	Ala	Val	Pro	Ala 380	Arg	Val	Ala	Asp
Gln 385	Arg	Gly	Arg	Val	Glu 390	Phe	Asp	His	Val	Ser 395	Phe	Arg	Tyr	Glu	Pro 400
Asp	Lys	Pro	Leu	Ile 405	Thr	Asp	Leu	Ser	Leu 410	Val	Ala	Glu	Pro	Gly 415	His
Thr	Val	Ala	Ile 420	Val	Gly	Pro	Thr	Gly 425	Ala	Gly	Lys	Thr	Thr 430	Leu	Val
Asn	Leu	Val 435	Met	Arg	Phe	Tyr	Glu 440	Leu	Asp	Ala	Gly	Arg 445	Ile	Thr	Leu
Asp	Gly 450	Val	Asp	Ile	Thr	Thr 455	Leu	Ser	Arg	Asp	Asp 460	Leu	Arg	Gly	Arg
Ile 465	Gly	Met	Val	Leu	Gln 470	Asp	Thr	Trp	Leu	Phe 475	Gly	Gly	Thr	Ile	Arg 480
Asp	Asn	Ile	Ala	Tyr 485	Gly	Arg	Pro	Asp	Ala 490	Ser	Glu	Glu	Glu	Ile 495	Val
Ala	Ala	Ala	Arg 500	Ala	Thr	Phe	Val	Asp 505	Arg	Phe	Val	Arg	Ser 510	Leu	Pro
Asp	Gly	Tyr 515	Asp	Thr	Val	Ile	Asp 520	Ser	Glu	Gly	Ser	Asn 525	Val	Ser	Ala
Gly	Glu 530	Lys	Gln	Leu	Ile	Thr 535	Ile	Ala	Arg	Ala	Phe 540	Leu	Ala	Glu	Pro

Ser Leu Leu Ile Leu Asp Glu Ala Thr Ser Ser Val Asp Thr Arg Thr
 545 550 555 560
 Glu Val Leu Leu Gln Arg Ala Met Ala Ala Leu Arg Ser Asp Arg Thr
 565 570 575
 Ser Phe Val Ile Ala His Arg Leu Ser Thr Ile Arg Asp Ala Asp Leu
 580 585 590
 Ile Leu Met Met Glu His Gly Arg Ile Val Glu Gln Gly Thr His Glu
 595 600 605
 Gln Leu Leu Ala Ala Arg Gly Ala Tyr His Arg Leu Tyr Gln Ala Gln
 610 615 620
 Phe Thr Gln Pro Asp Pro Ala Ala Val Gly Asp Pro Glu Pro Gln Pro
 625 630 635 640
 Ala Ser Val Arg Gly
 645

<210> 106
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 <212> DNA
 <213> *Micromonospora carbonacea*

<220>
 <221> CDS
 <222> (1)..(1401)

<220>
 <223> evbI

<400> 106
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 Val Ser Gln Ile Val Ile Ile Gly Gly Gly Pro Ala Gly Tyr Glu Ala
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 gcc ctg gtc gcc gcc cag ttg gac gct gat gtc acc gtg gtg gag gcc 96
 Ala Leu Val Ala Ala Gln Leu Asp Ala Asp Val Thr Val Val Glu Ala
 20 25 30
 gag ggg gcc ggc ggt gcc tgc gtg ctg tcc gac tgc gta ccg tcg aaa 144
 Glu Gly Ala Gly Gly Ala Cys Val Leu Ser Asp Cys Val Pro Ser Lys
 35 40 45
 acg ttc atc gcc agc tcg gag gtg gtc acc ggg tac ccg gac acc gag 192
 Thr Phe Ile Ala Ser Ser Glu Val Val Thr Gly Tyr Arg Asp Thr Glu
 50 55 60
 gag ttc ggg gtg cac tcc gac ggg ctg gag gcg gtc acc gtc gac gcc 240
 Glu Phe Gly Val His Ser Asp Gly Leu Glu Ala Val Thr Val Asp Ala
 65 70 75 80
 cgg gcc gtg cac gag cgg gtc aag cgg ctc gcc ctg gcc cag tcc gcc 288
 Arg Ala Val His Glu Arg Val Lys Arg Leu Ala Leu Ala Gln Ser Ala
 85 90 95
 gac atc cac gcg aag ctg gtg aaa gcc ggc gtc acc ttc gtg gcc gcc 336
 Asp Ile His Ala Lys Leu Val Lys Ala Gly Val Thr Phe Val Ala Gly
 100 105 110

acg gcc cgg ctc ggc gag gac atg ctg ggc cac acc cac cgc gtc gtc	384
Thr Ala Arg Leu Gly Glu Asp Met Leu Gly His Thr His Arg Val Val	
115 120 125	
gtc acg ccg gcc gac ggc tcc gag aag cac tcg atc gac gcg tcg acc	432
Val Thr Pro Ala Asp Gly Ser Glu Lys His Ser Ile Asp Ala Ser Thr	
130 135 140	
gtg ctg gtc gcc acc ggc gcc acc ccc cgc cag ctc ccc acg gcc gtg	480
Val Leu Val Ala Thr Gly Ala Thr Pro Arg Gln Leu Pro Thr Ala Val	
145 150 155 160	
ccg gac ggc gag cgc atc ctg acc tgg cgg cag gtg tac gac ctg ccg	528
Pro Asp Gly Glu Arg Ile Leu Thr Trp Arg Gln Val Tyr Asp Leu Pro	
165 170 175	
cac ctg ccc gag cac ctg atc gtc gtc ggt tcc ggc gtc acc ggt gcc	576
His Leu Pro Glu His Leu Ile Val Val Gly Ser Gly Val Thr Gly Ala	
180 185 190	
gag ttc gcc agc gcg tac ctg gcc atg ggg gtc ccg gtc acc ctc gtc	624
Glu Phe Ala Ser Ala Tyr Leu Ala Met Gly Val Pro Val Thr Leu Val	
195 200 205	
tcc agc cgg gac cgg gtg atg ccg cac gag gac gcc gac gcc gcc atg	672
Ser Ser Arg Asp Arg Val Met Pro His Glu Asp Ala Asp Ala Ala Met	
210 215 220	
gcg atc gag cgc gtg ttc cgc tcc cgg ggc atg acg atc ctc aac aac	720
Ala Ile Glu Arg Val Phe Arg Ser Arg Gly Met Thr Ile Leu Asn Asn	
225 230 235 240	
tcc cgc gcc gag agg gtc cag cgc atc gcc gac ggg gtg gag gtc gaa	768
Ser Arg Ala Glu Arg Val Gln Arg Ile Ala Asp Gly Val Glu Val Glu	
245 250 255	
ctg gcc gac ggc cgg ctg gtg cac ggc tcg cac gcg ctc atc gcg gtc	816
Leu Ala Asp Gly Arg Leu Val His Gly Ser His Ala Leu Ile Ala Val	
260 265 270	
ggc tcg atc ccc aac acc gcc aac ctc ggc ctc gcc gag tac ggc gtc	864
Gly Ser Ile Pro Asn Thr Ala Asn Leu Gly Leu Ala Glu Tyr Gly Val	
275 280 285	
gag ctg gcc cgg ggc ggc tac gtc acc gtc gac cgg gtg tcc cgc acc	912
Glu Leu Ala Arg Gly Gly Tyr Val Thr Val Asp Arg Val Ser Arg Thr	
290 295 300	
aac gtc ccc ggg atc tac gct gcc ggc gac tgc acc ggg gtg ttg ccg	960
Asn Val Pro Gly Ile Tyr Ala Ala Gly Asp Cys Thr Gly Val Leu Pro	
305 310 315 320	
ctg gcc agc gtc gcc gcc atg cag ggc cgg atc gcg atg tgg cac gcg	1008
Leu Ala Ser Val Ala Ala Met Gln Gly Arg Ile Ala Met Trp His Ala	
325 330 335	
ctc ggc gag gcg gtc cgg ccg ctg cgg ctg cgt acg gtg gcc gcg aac	1056
Leu Gly Glu Ala Val Arg Pro Leu Arg Leu Arg Thr Val Ala Ala Asn	
340 345 350	
gtc ttc acc gac ccg gag ttg gcc acc gtc ggc gtc tcc cag gac gag	1104
Val Phe Thr Asp Pro Glu Leu Ala Thr Val Gly Val Ser Gln Asp Glu	
355 360 365	
gtg gac gcc ggc aag acc ccg gcc cgc cag gtg atg ctg ccg ctg tcg	1152

Val	Asp	Ala	Gly	Lys	Thr	Pro	Ala	Arg	Gln	Val	Met	Leu	Pro	Leu	Ser		
370						375					380						
ggc	aac	gcc	cgg	gcg	aag	atg	gac	gac	ctc	gcc	gac	ggc	ttc	gtg	aag	1200	
Gly	Asn	Ala	Arg	Ala	Lys	Met	Asp	Asp	Leu	Ala	Asp	Gly	Phe	Val	Lys		
385					390					395					400		
ctg	ttc	tgc	cgc	ccg	gcc	agc	ggc	cag	gtg	atc	ggc	ggg	gtg	gtg	gtg	1248	
Leu	Phe	Cys	Arg	Pro	Ala	Ser	Gly	Gln	Val	Ile	Gly	Gly	Val	Val	Val		
				405					410					415			
gca	ccg	aag	gcc	agc	gag	ctg	atc	ctg	ccg	atc	acc	atg	gcg	gtg	gag	1296	
Ala	Pro	Lys	Ala	Ser	Glu	Leu	Ile	Leu	Pro	Ile	Thr	Met	Ala	Val	Glu		
			420					425					430				
aac	aac	ctc	acg	gtc	aac	gag	ttg	gcc	cag	acc	atc	acc	atc	tac	ccg	1344	
Asn	Asn	Leu	Thr	Val	Asn	Glu	Leu	Ala	Gln	Thr	Ile	Thr	Ile	Tyr	Pro		
		435					440					445					
agc	ctg	tcg	ggc	tcg	atc	acc	gag	gcc	gcc	cgc	cag	ctc	atg	ctc	cac	1392	
Ser	Leu	Ser	Gly	Ser	Ile	Thr	Glu	Ala	Ala	Arg	Gln	Leu	Met	Leu	His		
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gag	ctg	gag														1401	
Glu	Leu	Glu															
465																	

<210> 107

<211> 467

<212> PRT

<213> Micromonospora carbonacea

<220>

<223> evbI

<400> 107

Val	Ser	Gln	Ile	Val	Ile	Ile	Gly	Gly	Gly	Pro	Ala	Gly	Tyr	Glu	Ala		
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Ala	Leu	Val	Ala	Ala	Gln	Leu	Asp	Ala	Asp	Val	Thr	Val	Val	Glu	Ala		
			20					25					30				
Glu	Gly	Ala	Gly	Gly	Ala	Cys	Val	Leu	Ser	Asp	Cys	Val	Pro	Ser	Lys		
		35					40					45					
Thr	Phe	Ile	Ala	Ser	Ser	Glu	Val	Val	Thr	Gly	Tyr	Arg	Asp	Thr	Glu		
	50					55					60						
Glu	Phe	Gly	Val	His	Ser	Asp	Gly	Leu	Glu	Ala	Val	Thr	Val	Asp	Ala		
65					70					75					80		
Arg	Ala	Val	His	Glu	Arg	Val	Lys	Arg	Leu	Ala	Leu	Ala	Gln	Ser	Ala		
				85					90					95			
Asp	Ile	His	Ala	Lys	Leu	Val	Lys	Ala	Gly	Val	Thr	Phe	Val	Ala	Gly		
			100					105					110				
Thr	Ala	Arg	Leu	Gly	Glu	Asp	Met	Leu	Gly	His	Thr	His	Arg	Val	Val		
		115					120					125					
Val	Thr	Pro	Ala	Asp	Gly	Ser	Glu	Lys	His	Ser	Ile	Asp	Ala	Ser	Thr		
	130					135					140						
Val	Leu	Val	Ala	Thr	Gly	Ala	Thr	Pro	Arg	Gln	Leu	Pro	Thr	Ala	Val		

145	150	155	160
Pro Asp Gly Glu Arg 165	Ile Leu Thr Trp	Arg Gln Val Tyr 170	Asp Leu Pro 175
His Leu Pro Glu 180	His Leu Ile Val	Val Gly Ser Gly 185	Val Thr Gly Ala 190
Glu Phe Ala Ser Ala Tyr 195	Leu Ala Met	Gly Val Pro Val 200 205	Thr Leu Val
Ser Ser Arg Asp Arg 210	Val Met Pro His 215	Glu Asp Ala Asp 220	Ala Ala Met
Ala Ile Glu Arg Val 225	Phe Arg Ser Arg 230	Gly Met Thr Ile 235	Leu Asn Asn 240
Ser Arg Ala Glu Arg 245	Val Gln Arg Ile	Ala Asp Gly Val 250	Glu Val Glu 255
Leu Ala Asp Gly 260	Arg Leu Val His	Gly Ser His Ala 265	Leu Ile Ala Val 270
Gly Ser Ile Pro Asn Thr 275	Ala Asn Leu	Gly Leu Ala Glu 280 285	Tyr Gly Val
Glu Leu Ala Arg Gly Gly 290	Tyr Val Thr Val	Asp Arg Val Ser 300	Arg Thr
Asn Val Pro Gly Ile Tyr 305	Ala Ala Gly Asp 310	Cys Thr Gly Val 315	Leu Pro 320
Leu Ala Ser Val Ala 325	Ala Met Gln Gly 330	Arg Ile Ala Met 335	Trp His Ala
Leu Gly Glu Ala Val 340	Arg Pro Leu Arg 345	Leu Arg Thr Val 350	Ala Ala Asn
Val Phe Thr Asp Pro 355	Glu Leu Ala Thr 360	Val Gly Val Ser 365	Gln Asp Glu
Val Asp Ala Gly Lys Thr 370	Pro Ala Arg Gln 375	Val Met Leu Pro 380	Leu Ser
Gly Asn Ala Arg Ala Lys 385	Met Asp Asp Leu 390	Ala Asp Gly Phe 395	Val Val Lys 400
Leu Phe Cys Arg Pro 405	Ala Ser Gly Gln 410	Val Ile Gly Gly 415	Val Val Val
Ala Pro Lys Ala Ser 420	Glu Leu Ile Leu 425	Pro Ile Thr Met 430	Ala Val Glu
Asn Asn Leu Thr Val 435	Asn Glu Leu Ala 440	Gln Thr Ile Thr 445	Ile Tyr Pro
Ser Leu Ser Gly Ser 450	Ile Thr Glu Ala 455	Ala Arg Gln Leu 460	Met Leu His
Glu Leu Glu 465			

<211> 453
 <212> DNA
 <213> Micromonospora carbonacea

<220>
 <221> CDS
 <222> (1) .. (453)

<220>
 <223> evbJ

<400> 108
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 cgc gcc tac tgc ccg cac tcc ccg atg gtc ggc gtc ggc tgg ctg gag 96
 Arg Ala Tyr Cys Pro His Ser Pro Met Val Gly Val Gly Trp Leu Glu
 20 25 30
 ggc tgg cgg ctc acc ttc gcg ggt gag ggc gcg atc ggc tgg gag ggc 144
 Gly Trp Arg Leu Thr Phe Ala Gly Glu Gly Ala Ile Gly Trp Glu Gly
 35 40 45
 gcg gtc agc acc atc gtc gag tcc ccc ggt gat cgg gtg ttc gtg gcg 192
 Ala Val Ser Thr Ile Val Glu Ser Pro Gly Asp Arg Val Phe Val Ala
 50 55 60
 ctc tac gac atc cac ccg tac gac gcc gtc cag ctc gac gag atc gag 240
 Leu Tyr Asp Ile His Pro Tyr Asp Ala Val Gln Leu Asp Glu Ile Glu
 65 70 75 80
 ggg gtg gcc tcc ggg acg tac cgc aag ctg cac gtc cgc gtc tcc acc 288
 Gly Val Ala Ser Gly Thr Tyr Arg Lys Leu His Val Arg Val Ser Thr
 85 90 95
 ctc gac ggc gac gtg acc gcg tgg gtc tac gtc ttc gac ggg tac gag 336
 Leu Asp Gly Asp Val Thr Ala Trp Val Tyr Val Phe Asp Gly Tyr Glu
 100 105 110
 ggc ggc ctg ccg acg gcg tgg tat ctg tcg gag atc gcc aac gcc gcc 384
 Gly Gly Leu Pro Thr Ala Trp Tyr Leu Ser Glu Ile Ala Asn Ala Ala
 115 120 125
 gag aag gcg ggc gcg ccc gac gac tac gtc agc gag ctg cgg tcc cgc 432
 Glu Lys Ala Gly Ala Pro Asp Asp Tyr Val Ser Glu Leu Arg Ser Arg
 130 135 140
 ccc acc ggc acg gcg tcg gcg 453
 Pro Thr Gly Thr Ala Ser Ala
 145 150

<210> 109
 <211> 151
 <212> PRT
 <213> Micromonospora carbonacea

<220>
 <223> evbJ

<400> 109
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 1 5 10 15

Arg Ala Tyr Cys Pro His Ser Pro Met Val Gly Val Gly Trp Leu Glu
 20 25 30
 Gly Trp Arg Leu Thr Phe Ala Gly Glu Gly Ala Ile Gly Trp Glu Gly
 35 40 45
 Ala Val Ser Thr Ile Val Glu Ser Pro Gly Asp Arg Val Phe Val Ala
 50 55 60
 Leu Tyr Asp Ile His Pro Tyr Asp Ala Val Gln Leu Asp Glu Ile Glu
 65 70 75 80
 Gly Val Ala Ser Gly Thr Tyr Arg Lys Leu His Val Arg Val Ser Thr
 85 90 95
 Leu Asp Gly Asp Val Thr Ala Trp Val Tyr Val Phe Asp Gly Tyr Glu
 100 105 110
 Gly Gly Leu Pro Thr Ala Trp Tyr Leu Ser Glu Ile Ala Asn Ala Ala
 115 120 125
 Glu Lys Ala Gly Ala Pro Asp Asp Tyr Val Ser Glu Leu Arg Ser Arg
 130 135 140
 Pro Thr Gly Thr Ala Ser Ala
 145 150

<210> 110
 <211> 963
 <212> DNA
 <213> Micromonospora carbonacea

<220>
 <221> CDS
 <222> (1)..(963)

<220>
 <223> evbK

<400> 110
 gtg act ctt ccc gct gac tgg gcg gcg cgc cgc ccc acc ctc gac gac 48
 Val Thr Leu Pro Ala Asp Trp Ala Ala Arg Arg Pro Thr Leu Asp Asp
 1 5 10 15
 gtc cct ggg atc ctc gcc gtc gtg cac gcc gca gac acc ttc gcg atc 96
 Val Pro Gly Ile Leu Ala Val Val His Ala Ala Asp Thr Phe Ala Ile
 20 25 30
 ggc cac ccg gac ttc gac gcc gaa gac gtc aag gcc gcc ctg acg gcc 144
 Gly His Pro Asp Phe Asp Ala Glu Asp Val Lys Ala Ala Leu Thr Ala
 35 40 45
 ccc ttc ttc gac ccg gcg cgc gac tcc tgg ctg gtc agc gac ccg cag 192
 Pro Phe Phe Asp Pro Ala Arg Asp Ser Trp Leu Val Ser Asp Pro Gln
 50 55 60
 ggc cgg ctc gtc gcc tgg tcg gtg gtg gac aac ccg acc ggg gtg ggc 240
 Gly Arg Leu Val Ala Trp Ser Val Val Asp Asn Pro Thr Gly Val Gly
 65 70 75 80
 cgg gag ttc gtc gac gtc ctc gtc gac ccg gag cgc gcc gag gcg gta 288
 Arg Glu Phe Val Asp Val Leu Val Asp Pro Glu Arg Ala Glu Ala Val
 85 90 95

cgc gcc ccg ctg ctc gct ctg atg ctg gac cgg gtc gcc gag cgg gcc	336
Arg Ala Pro Leu Leu Ala Leu Met Leu Asp Arg Val Ala Glu Arg Ala	
100 105 110	
gcg gag cgg agc ctg ccc gcg ctg acc gtc cgc gcc tcg gcc tac ccg	384
Ala Glu Arg Ser Leu Pro Ala Leu Thr Val Arg Ala Ser Ala Tyr Pro	
115 120 125	
ccg gag acc cgc tgg gtg acg gag ctg acc gag gcc ggt ttc agc cgg	432
Pro Glu Thr Arg Trp Val Thr Glu Leu Thr Glu Ala Gly Phe Ser Arg	
130 135 140	
gtg aag cgg tac gta cgg atg agt cgt gac ctg gcc ggg ctg ccc gcc	480
Val Lys Arg Tyr Val Arg Met Ser Arg Asp Leu Ala Gly Leu Pro Ala	
145 150 155 160	
gag ccg ccg ccc cca ccc ggg gtg acg gtc cgg ccg ctg cgc gcc ggc	528
Glu Pro Pro Pro Pro Pro Gly Val Thr Val Arg Pro Leu Arg Ala Gly	
165 170 175	
gac gag gac gac ctg cgc ctg ttc cac cgg atc tac gac acg gcg ttc	576
Asp Glu Asp Asp Leu Arg Leu Phe His Arg Ile Tyr Asp Thr Ala Phe	
180 185 190	
cgg gac acc ccg gac tac gag ccg gcc ggg tac gac cac tgg cgg gag	624
Arg Asp Thr Pro Asp Tyr Glu Pro Ala Gly Tyr Asp His Trp Arg Glu	
195 200 205	
cgt ctg ccc gcg tac gac agg acc tgg gac gag tgg ttc gtc gcc gag	672
Arg Leu Pro Ala Tyr Asp Arg Thr Trp Asp Glu Trp Phe Val Ala Glu	
210 215 220	
gtc gac ggg gag ccg gcc ggc gcg ttg cag tcg tcc gac cag gcg ctg	720
Val Asp Gly Glu Pro Ala Gly Ala Leu Gln Ser Ser Asp Gln Ala Leu	
225 230 235 240	
gaa cag gac tcg ggc tgg gtg cgg acc ctg tcg gtg ctg ccg aag tac	768
Glu Gln Asp Ser Gly Trp Val Arg Thr Leu Ser Val Leu Pro Lys Tyr	
245 250 255	
cgg cgg cac ggg gtc ggc gcc gcg ctg ctg tgg cgg gcc ttc acg gtc	816
Arg Arg His Gly Val Gly Ala Ala Leu Leu Trp Arg Ala Phe Thr Val	
260 265 270	
tac gcg gcg aag gga cgg cgg cac gcc ggc ctc ggc gtc gac ctg acc	864
Tyr Ala Ala Lys Gly Arg Arg His Ala Gly Leu Gly Val Asp Leu Thr	
275 280 285	
aac ccg acc tcc ccg gcg acg ctc tac cgc tcg gtg ggg ctg cgc gag	912
Asn Pro Thr Ser Pro Ala Thr Leu Tyr Arg Ser Val Gly Leu Arg Glu	
290 295 300	
atg cgc tgg acc gac atg tac gag cgc acc gtc ccc gcc gcc acg gcg	960
Met Arg Trp Thr Asp Met Tyr Glu Arg Thr Val Pro Ala Ala Thr Ala	
305 310 315 320	
gtg	963
Val	

<210> 111

<211> 321

<212> PRT

<213> Micromonospora carbonacea

<220>

<223> evbK

<400> 111

Val	Thr	Leu	Pro	Ala	Asp	Trp	Ala	Ala	Arg	Arg	Pro	Thr	Leu	Asp	Asp
1				5					10					15	
Val	Pro	Gly	Ile	Leu	Ala	Val	Val	His	Ala	Ala	Asp	Thr	Phe	Ala	Ile
			20					25					30		
Gly	His	Pro	Asp	Phe	Asp	Ala	Glu	Asp	Val	Lys	Ala	Ala	Leu	Thr	Ala
		35					40					45			
Pro	Phe	Phe	Asp	Pro	Ala	Arg	Asp	Ser	Trp	Leu	Val	Ser	Asp	Pro	Gln
	50					55					60				
Gly	Arg	Leu	Val	Ala	Trp	Ser	Val	Val	Asp	Asn	Pro	Thr	Gly	Val	Gly
65					70					75					80
Arg	Glu	Phe	Val	Asp	Val	Leu	Val	Asp	Pro	Glu	Arg	Ala	Glu	Ala	Val
				85					90					95	
Arg	Ala	Pro	Leu	Leu	Ala	Leu	Met	Leu	Asp	Arg	Val	Ala	Glu	Arg	Ala
			100					105					110		
Ala	Glu	Arg	Ser	Leu	Pro	Ala	Leu	Thr	Val	Arg	Ala	Ser	Ala	Tyr	Pro
		115					120					125			
Pro	Glu	Thr	Arg	Trp	Val	Thr	Glu	Leu	Thr	Glu	Ala	Gly	Phe	Ser	Arg
	130					135						140			
Val	Lys	Arg	Tyr	Val	Arg	Met	Ser	Arg	Asp	Leu	Ala	Gly	Leu	Pro	Ala
145					150					155					160
Glu	Pro	Pro	Pro	Pro	Pro	Gly	Val	Thr	Val	Arg	Pro	Leu	Arg	Ala	Gly
				165					170					175	
Asp	Glu	Asp	Asp	Leu	Arg	Leu	Phe	His	Arg	Ile	Tyr	Asp	Thr	Ala	Phe
			180					185					190		
Arg	Asp	Thr	Pro	Asp	Tyr	Glu	Pro	Ala	Gly	Tyr	Asp	His	Trp	Arg	Glu
		195					200					205			
Arg	Leu	Pro	Ala	Tyr	Asp	Arg	Thr	Trp	Asp	Glu	Trp	Phe	Val	Ala	Glu
	210					215					220				
Val	Asp	Gly	Glu	Pro	Ala	Gly	Ala	Leu	Gln	Ser	Ser	Asp	Gln	Ala	Leu
225					230					235					240
Glu	Gln	Asp	Ser	Gly	Trp	Val	Arg	Thr	Leu	Ser	Val	Leu	Pro	Lys	Tyr
				245					250					255	
Arg	Arg	His	Gly	Val	Gly	Ala	Ala	Leu	Leu	Trp	Arg	Ala	Phe	Thr	Val
			260					265					270		
Tyr	Ala	Ala	Lys	Gly	Arg	Arg	His	Ala	Gly	Leu	Gly	Val	Asp	Leu	Thr
		275					280					285			
Asn	Pro	Thr	Ser	Pro	Ala	Thr	Leu	Tyr	Arg	Ser	Val	Gly	Leu	Arg	Glu
	290					295					300				
Met	Arg	Trp	Thr	Asp	Met	Tyr	Glu	Arg	Thr	Val	Pro	Ala	Ala	Thr	Ala
305					310					315					320

Val

<210> 112
 <211> 747
 <212> DNA
 <213> Micromonospora carbonacea

<220>
 <221> CDS
 <222> (1)..(747)

<220>
 <223> evbL

<400> 112
 atg acg ccg gag cag gtc gcc gcc gcg agc aag ccg ttg gtg ctg gag 48
 Met Thr Pro Glu Gln Val Ala Ala Ala Ser Lys Pro Leu Val Leu Glu
 1 5 10 15
 ctc ggg gag atg ttc gcc cgc tgc ccg gcc acc ctg cac cgg gcc cgt 96
 Leu Gly Glu Met Phe Ala Arg Cys Pro Ala Thr Leu His Arg Ala Arg
 20 25 30
 ctg ctg ggc atc tcc ggc tgg gcc ttc cac atc gcc ggc cgg gcc ggg 144
 Leu Leu Gly Ile Ser Gly Trp Ala Phe His Ile Ala Gly Arg Ala Gly
 35 40 45
 gtg ctc ggc gac gtc ggg gcc gcc acg gtg agc gcg gcc ctc ggc ttc 192
 Val Leu Gly Asp Val Gly Ala Ala Thr Val Ser Ala Ala Leu Gly Phe
 50 55 60
 gtc gcc ccc gac gcg gtc gcc gac ggg tgg gac gcc gcc gcc cgc gtg 240
 Val Ala Pro Asp Ala Val Ala Asp Gly Trp Asp Ala Ala Ala Arg Val
 65 70 75 80
 cac gct ccg ctg gag gtg gcc acg gcg aac ctg gcc gag tgc tgc cgg 288
 His Ala Pro Leu Glu Val Ala Thr Ala Asn Leu Ala Glu Cys Cys Arg
 85 90 95
 tgg ggc agc gag cac ctg acc gcc gtg ccc ggc gtg atc cgt ctg gcg 336
 Trp Gly Ser Glu His Leu Thr Ala Val Pro Gly Val Ile Arg Leu Ala
 100 105 110
 acg ctg ctg cac cgg gtg gtc gac gcc gcg gac gcc agc ggg atg cca 384
 Thr Leu Leu His Arg Val Val Asp Ala Ala Asp Ala Ser Gly Met Pro
 115 120 125
 ctc ttt gcc gcc tgg cgg gcc gtg ccg ccg ccg gac gac acc ccg ggg 432
 Leu Phe Ala Ala Trp Arg Ala Val Pro Pro Pro Asp Asp Thr Pro Gly
 130 135 140
 gcc cgt gcc gcc gcc ggg ctg ctg ctg ctt cgg gag cac ttc gcc ggg 480
 Ala Arg Ala Ala Ala Gly Leu Leu Leu Leu Arg Glu His Phe Ala Gly
 145 150 155 160
 gcg tac ctg ctg gcg gtg cgg gcc ggc ggg atg acg ccg ctg gag gcg 528
 Ala Tyr Leu Leu Ala Val Arg Ala Gly Gly Met Thr Pro Leu Glu Ala
 165 170 175
 gtg ctg gcc ggg ccg gag ggg gag gcc ggg gcg ctg gcc tgc ggc tgg 576
 Val Leu Ala Gly Pro Glu Gly Glu Ala Gly Ala Leu Ala Cys Gly Trp
 180 185 190

ccg ccg ccg tac ccc cgg gtc ggg ccg ctg gtg cgc cgc cgg ctg tgg 624
 Pro Pro Pro Tyr Pro Arg Val Gly Pro Leu Val Arg Arg Arg Leu Trp
 195 200 205
 tcg gag gcg gtg acc gac cgg ctg gtg tcg acc gga ttc cgg gcg ctc 672
 Ser Glu Ala Val Thr Asp Arg Leu Val Ser Thr Gly Phe Arg Ala Leu
 210 215 220
 acg ccg gcc gag ggc acc gcg ctg ctc gac ctg ctg acc acc gca cgc 720
 Thr Pro Ala Glu Gly Thr Ala Leu Leu Asp Leu Leu Thr Thr Ala Arg
 225 230 235 240
 gcc gtg gtg caa gga agg gcc cct tac 747
 Ala Val Val Gln Gly Arg Ala Pro Tyr
 245

<210> 113
 <211> 249
 <212> PRT
 <213> Micromonospora carbonacea

<220>
 <223> evbL

<400> 113
 Met Thr Pro Glu Gln Val Ala Ala Ala Ser Lys Pro Leu Val Leu Glu
 1 5 10 15
 Leu Gly Glu Met Phe Ala Arg Cys Pro Ala Thr Leu His Arg Ala Arg
 20 25 30
 Leu Leu Gly Ile Ser Gly Trp Ala Phe His Ile Ala Gly Arg Ala Gly
 35 40 45
 Val Leu Gly Asp Val Gly Ala Ala Thr Val Ser Ala Ala Leu Gly Phe
 50 55 60
 Val Ala Pro Asp Ala Val Ala Asp Gly Trp Asp Ala Ala Ala Arg Val
 65 70 75 80
 His Ala Pro Leu Glu Val Ala Thr Ala Asn Leu Ala Glu Cys Cys Arg
 85 90 95
 Trp Gly Ser Glu His Leu Thr Ala Val Pro Gly Val Ile Arg Leu Ala
 100 105 110
 Thr Leu Leu His Arg Val Val Asp Ala Ala Asp Ala Ser Gly Met Pro
 115 120 125
 Leu Phe Ala Ala Trp Arg Ala Val Pro Pro Pro Asp Asp Thr Pro Gly
 130 135 140
 Ala Arg Ala Ala Ala Gly Leu Leu Leu Leu Arg Glu His Phe Ala Gly
 145 150 155 160
 Ala Tyr Leu Leu Ala Val Arg Ala Gly Gly Met Thr Pro Leu Glu Ala
 165 170 175
 Val Leu Ala Gly Pro Glu Gly Glu Ala Gly Ala Leu Ala Cys Gly Trp
 180 185 190
 Pro Pro Pro Tyr Pro Arg Val Gly Pro Leu Val Arg Arg Arg Leu Trp
 195 200 205

Ser Glu Ala Val Thr Asp Arg Leu Val Ser Thr Gly Phe Arg Ala Leu
 210 215 220
 Thr Pro Ala Glu Gly Thr Ala Leu Leu Asp Leu Leu Thr Thr Ala Arg
 225 230 235 240
 Ala Val Val Gln Gly Arg Ala Pro Tyr
 245

<210> 114
 <211> 918
 <212> DNA
 <213> Micromonospora carbonacea

<220>
 <221> CDS
 <222> (1)..(918)

<220>
 <223> evbM

<400> 114
 gtg ccg ccc ccg cag agc ctc ctc cgg cgg ctc tac acc gag ccg ccg 48
 Val Pro Pro Pro Gln Ser Leu Leu Arg Arg Leu Tyr Thr Glu Pro Pro
 1 5 10 15
 gag aag ttc gtc gcc acc cgc gac gcc gcc gtc gcc gag gcc ccg cgc 96
 Glu Lys Phe Val Ala Thr Arg Asp Ala Ala Val Ala Glu Ala Arg Arg
 20 25 30
 tcc ggc gac ccg gcc acg gcc cgc gag atc gcc cgg ctg cgc cgc ccg 144
 Ser Gly Asp Pro Ala Thr Ala Arg Glu Ile Ala Arg Leu Arg Arg Pro
 35 40 45
 acc gtg gcc gcg tgg ctg gtc aac ctg ctc gcc ctg cgc cgc ccc gag 192
 Thr Val Val Ala Ala Trp Leu Val Asn Leu Leu Ala Leu Arg Arg Pro Glu
 50 55 60
 ctg gtc gcc gac ctg acc caa ctc gcc gag gcg ctg cgc cgc gcc cag 240
 Leu Val Ala Asp Leu Thr Gln Leu Ala Glu Ala Leu Arg Arg Ala Gln
 65 70 75 80
 cgc gac ctg cgc ggc ccc cgg ctg cgg gaa ctc tcc gcc cag ccg ccg 288
 Arg Asp Leu Arg Gly Pro Arg Leu Arg Glu Leu Ser Ala Gln Arg Arg
 85 90 95
 gcg gcg gtc gcc gcg ctg gtc gcc gag gcg cgc cgg ctg gcc gcc gac 336
 Ala Ala Val Ala Ala Leu Val Ala Glu Ala Arg Arg Leu Ala Ala Asp
 100 105 110
 gcc gag ggc ggc ccg ccg gcc ggg aag ctg ccg ctg ggc gag gtg gag 384
 Ala Glu Gly Gly Pro Pro Ala Gly Lys Leu Pro Leu Gly Glu Val Glu
 115 120 125
 gcg acg ctc gac gcc gcg ctc tcc gac acg gag gtg gcc ggg cag gtg 432
 Ala Thr Leu Asp Ala Ala Leu Ser Asp Thr Glu Val Ala Gly Gln Val
 130 135 140
 cgc tcc ggc ccg ctg ctg ccg gcc gcc agc tac gcc gcc ttc gcc gag 480
 Arg Ser Gly Arg Leu Leu Arg Ala Ala Ser Tyr Ala Gly Phe Gly Glu
 145 150 155 160

gtg ccc cgc ccc cag ctc cgt ttg gtc acc ggc ggc gag gag cag cca 528
 Val Pro Arg Pro Gln Leu Arg Leu Val Thr Gly Gly Glu Glu Gln Pro
 165 170 175
 ccg ccc acc cac cca cca ccg cgc gcg aag cgg gcc gcc cgg gag gcc 576
 Pro Pro Thr His Pro Pro Pro Arg Ala Lys Arg Ala Ala Arg Glu Ala
 180 185 190
 gag cgc gcc gcc cgt gcc gag cgg gcc cgg caa cgc cgg atg ctg gaa 624
 Glu Arg Ala Ala Arg Ala Glu Arg Ala Arg Gln Arg Arg Met Leu Glu
 195 200 205
 cgg gaa ctg gcg cgg gcg cgt acc gac cag gag cgg gcc gag gcg gag 672
 Arg Glu Leu Ala Arg Ala Arg Thr Asp Gln Glu Arg Ala Glu Ala Glu
 210 215 220
 ctg gcc ggc gcg gtg gag gcc gag cac gac cag gag gaa ctg acc 720
 Leu Ala Gly Ala Val Glu Ala Glu His Asp Gly Ala Glu Glu Leu Thr
 225 230 235 240
 ggc atc gag cgg tcg ctg gcc gag ctg gag cga tcg cgc gca gag gcc 768
 Gly Ile Glu Arg Ser Leu Ala Glu Leu Glu Arg Ser Arg Ala Glu Ala
 245 250 255
 gag cag gaa ctc agc cgg cgg aag ctg gcc cgg cgg gcg gcg gaa cgg 816
 Glu Gln Glu Leu Ser Arg Arg Lys Leu Ala Arg Arg Ala Ala Glu Arg
 260 265 270
 gcc gtc acc gcc gcc cag cgc cgc acc ggc gaa atc gag ggg gcg atc 864
 Ala Val Thr Ala Ala Gln Arg Arg Thr Gly Glu Ile Glu Gly Ala Ile
 275 280 285
 gag gcg gtc gac gcc gaa gac ggg gct gtc acg gaa ggc ccc ggc ggg 912
 Glu Ala Val Asp Ala Glu Asp Gly Ala Val Thr Glu Gly Pro Gly Gly
 290 295 300
 gca gac 918
 Ala Asp
 305

<210> 115

<211> 306

<212> PRT

<213> Micromonospora carbonacea

<220>

<223> evbM

<400> 115

Val Pro Pro Pro Gln Ser Leu Leu Arg Arg Leu Tyr Thr Glu Pro Pro
 1 5 10 15

Glu Lys Phe Val Ala Thr Arg Asp Ala Ala Val Ala Glu Ala Arg Arg
 20 25 30

Ser Gly Asp Pro Ala Thr Ala Arg Glu Ile Ala Arg Leu Arg Arg Pro
 35 40 45

Thr Val Ala Ala Trp Leu Val Asn Leu Leu Ala Leu Arg Arg Pro Glu
 50 55 60

Leu Val Ala Asp Leu Thr Gln Leu Ala Glu Ala Leu Arg Arg Ala Gln
 65 70 75 80

Arg Asp Leu Arg Gly Pro Arg Leu Arg Glu Leu Ser Ala Gln Arg Arg
 85 90 95
 Ala Ala Val Ala Ala Leu Val Ala Glu Ala Arg Arg Leu Ala Ala Asp
 100 105 110
 Ala Glu Gly Gly Pro Pro Ala Gly Lys Leu Pro Leu Gly Glu Val Glu
 115 120 125
 Ala Thr Leu Asp Ala Ala Leu Ser Asp Thr Glu Val Ala Gly Gln Val
 130 135 140
 Arg Ser Gly Arg Leu Leu Arg Ala Ala Ser Tyr Ala Gly Phe Gly Glu
 145 150 155 160
 Val Pro Arg Pro Gln Leu Arg Leu Val Thr Gly Gly Glu Glu Gln Pro
 165 170 175
 Pro Pro Thr His Pro Pro Pro Arg Ala Lys Arg Ala Ala Arg Glu Ala
 180 185 190
 Glu Arg Ala Ala Arg Ala Glu Arg Ala Arg Gln Arg Arg Met Leu Glu
 195 200 205
 Arg Glu Leu Ala Arg Ala Arg Thr Asp Gln Glu Arg Ala Glu Ala Glu
 210 215 220
 Leu Ala Gly Ala Val Glu Ala Glu His Asp Gly Ala Glu Glu Leu Thr
 225 230 235 240
 Gly Ile Glu Arg Ser Leu Ala Glu Leu Glu Arg Ser Arg Ala Glu Ala
 245 250 255
 Glu Gln Glu Leu Ser Arg Arg Lys Leu Ala Arg Arg Ala Ala Glu Arg
 260 265 270
 Ala Val Thr Ala Ala Gln Arg Arg Thr Gly Glu Ile Glu Gly Ala Ile
 275 280 285
 Glu Ala Val Asp Ala Glu Asp Gly Ala Val Thr Glu Gly Pro Gly Gly
 290 295 300
 Ala Asp
 305

<210> 116

<211> 627

<212> DNA

<213> Micromonospora carbonacea

<220>

<221> CDS

<222> (1)..(627)

<220>

<223> evbN

<400> 116

atg	cag	ctc	acc	aaa	ttc	gcc	cac	tcc	tgc	ctc	cgc	gtc	gag	cac	gac	48
Met	Gln	Leu	Thr	Lys	Phe	Ala	His	Ser	Cys	Leu	Arg	Val	Glu	His	Asp	
1				5					10					15		
ggc	ggt	gtg	ctg	gtc	gtc	gac	ccg	ggc	gtc	ttc	agc	gac	ccg	acc	gcg	96

Gly	Gly	Val	Leu	Val	Val	Asp	Pro	Gly	Val	Phe	Ser	Asp	Pro	Thr	Ala	
			20					25					30			
ctg	gac	ggt	gcg	gac	gcg	gtg	ctg	atc	acc	cat	gag	cac	ccc	gac	cac	144
Leu	Asp	Gly	Ala	Asp	Ala	Val	Leu	Ile	Thr	His	Glu	His	Pro	Asp	His	
		35					40				45					
gtg	gac	gtc	gcg	gct	ctc	acc	cgg	cag	ctc	gac	cgc	tgg	ccg	ttc	cgc	192
Val	Asp	Val	Ala	Ala	Leu	Thr	Arg	Gln	Leu	Asp	Arg	Trp	Pro	Phe	Arg	
	50					55					60					
atc	tac	ggc	ccg	gcc	tcg	ctg	gcc	ggg	gcc	ctc	ggc	gac	gtg	gcc	gaa	240
Ile	Tyr	Gly	Pro	Ala	Ser	Leu	Ala	Gly	Ala	Leu	Gly	Asp	Val	Ala	Glu	
	65				70					75					80	
gcc	ctg	gag	ccc	atc	tca	ccc	ggg	cag	gcg	ttc	acc	gcg	gcg	ggc	gtg	288
Ala	Leu	Glu	Pro	Ile	Ser	Pro	Gly	Gln	Ala	Phe	Thr	Ala	Ala	Gly	Val	
				85				90						95		
gcg	gtg	cgc	gcg	tac	ggc	ggg	cgg	cac	gcc	gtc	atc	cat	ccc	gac	atc	336
Ala	Val	Arg	Ala	Tyr	Gly	Gly	Arg	His	Ala	Val	Ile	His	Pro	Asp	Ile	
			100					105					110			
ccg	gtc	gtg	gac	aac	ctc	ggg	tat	ctg	ctg	aac	gac	gtc	gtc	tac	cac	384
Pro	Val	Val	Asp	Asn	Leu	Gly	Tyr	Leu	Leu	Asn	Asp	Val	Val	Tyr	His	
		115					120					125				
ccc	ggc	gac	gcc	ctg	gtg	gca	ccc	gag	gac	gcc	ccc	gtg	gac	acc	ctc	432
Pro	Gly	Asp	Ala	Leu	Val	Ala	Pro	Glu	Asp	Ala	Pro	Val	Asp	Thr	Leu	
	130					135					140					
ttc	gcg	ccg	atc	cac	gcc	ccc	tgg	tcg	aag	ttc	tcc	gag	gtg	ctc	gac	480
Phe	Ala	Pro	Ile	His	Ala	Pro	Trp	Ser	Lys	Phe	Ser	Glu	Val	Leu	Asp	
	145				150					155					160	
ttc	atc	cgc	gcg	gtc	gcc	ccg	cgc	cga	gcc	ttc	gcc	ctg	cac	gac	ggg	528
Phe	Ile	Arg	Ala	Val	Ala	Pro	Arg	Arg	Ala	Phe	Ala	Leu	His	Asp	Gly	
				165					170					175		
ctg	ctc	aac	gac	aac	ggc	ctc	gcc	gtc	ctc	aac	cgt	cag	tac	gcc	gcg	576
Leu	Leu	Asn	Asp	Asn	Gly	Leu	Ala	Val	Leu	Asn	Arg	Gln	Tyr	Ala	Ala	
			180					185					190			
ctg	tcg	ggg	acc	gac	tac	cag	cgc	ctc	gag	ccg	ggc	agc	cgg	ctc	gac	624
Leu	Ser	Gly	Thr	Asp	Tyr	Gln	Arg	Leu	Glu	Pro	Gly	Ser	Arg	Leu	Asp	
		195					200					205				
gtc																627
Val																

<210> 117

<211> 209

<212> PRT

<213> Micromonospora carbonacea

<220>

<223> evbN

<400> 117

Met	Gln	Leu	Thr	Lys	Phe	Ala	His	Ser	Cys	Leu	Arg	Val	Glu	His	Asp
1				5					10					15	

Gly	Gly	Val	Leu	Val	Val	Asp	Pro	Gly	Val	Phe	Ser	Asp	Pro	Thr	Ala
			20					25					30		

Leu Asp Gly Ala Asp Ala Val Leu Ile Thr His Glu His Pro Asp His
 35 40 45
 Val Asp Val Ala Ala Leu Thr Arg Gln Leu Asp Arg Trp Pro Phe Arg
 50 55 60
 Ile Tyr Gly Pro Ala Ser Leu Ala Gly Ala Leu Gly Asp Val Ala Glu
 65 70 75 80
 Ala Leu Glu Pro Ile Ser Pro Gly Gln Ala Phe Thr Ala Ala Gly Val
 85 90 95
 Ala Val Arg Ala Tyr Gly Gly Arg His Ala Val Ile His Pro Asp Ile
 100 105 110
 Pro Val Val Asp Asn Leu Gly Tyr Leu Leu Asn Asp Val Val Tyr His
 115 120 125
 Pro Gly Asp Ala Leu Val Ala Pro Glu Asp Ala Pro Val Asp Thr Leu
 130 135 140
 Phe Ala Pro Ile His Ala Pro Trp Ser Lys Phe Ser Glu Val Leu Asp
 145 150 155 160
 Phe Ile Arg Ala Val Ala Pro Arg Arg Ala Phe Ala Leu His Asp Gly
 165 170 175
 Leu Leu Asn Asp Asn Gly Leu Ala Val Leu Asn Arg Gln Tyr Ala Ala
 180 185 190
 Leu Ser Gly Thr Asp Tyr Gln Arg Leu Glu Pro Gly Ser Arg Leu Asp
 195 200 205
 Val

<210> 118
 <211> 690
 <212> DNA
 <213> Micromonospora carbonacea

<220>
 <221> CDS
 <222> (1)..(690)

<220>
 <223> evbo

<400> 118
 atg cgg gtg cgg gtg gac gat gtg gac gcc gcc gcc cgg tcc gcc atc 48
 Met Arg Val Arg Val Asp Asp Val Asp Ala Ala Ala Arg Ser Ala Ile
 1 5 10 15
 acg gcg gtc acc ggc gtc ggc ggc ttc gtc ggc ggc gac gag cgc agc 96
 Thr Ala Val Thr Gly Val Gly Gly Phe Val Gly Gly Asp Glu Arg Ser
 20 25 30
 agc ggc gga acc gcc gac gcc cgg gcg gag ttg caa ctg cgg gtg ccg 144
 Ser Gly Gly Thr Ala Asp Ala Arg Ala Glu Leu Gln Leu Arg Val Pro
 35 40 45
 gcg gag cgg ttc acg gcc gtc ctg gag gag ttg gcg agg ctc ggc cgg 192

Ala	Glu	Arg	Phe	Thr	Ala	Val	Leu	Glu	Glu	Leu	Ala	Arg	Leu	Gly	Arg		
	50					55					60						
cag	gag	cag	cgg	gcg	atc	cgc	acg	gag	gac	gtg	acc	gag	gag	acc	gtg	240	
Gln	Glu	Gln	Arg	Ala	Ile	Arg	Thr	Glu	Asp	Val	Thr	Glu	Glu	Thr	Val		
	65				70				75						80		
gat	ctc	gac	gcg	cgg	atc	gcc	acc	caa	cgg	gcc	cgg	gtc	gag	agc	ggc	288	
Asp	Leu	Asp	Ala	Arg	Ile	Ala	Thr	Gln	Arg	Ala	Arg	Val	Glu	Ser	Gly		
				85				90						95			
cgc	aag	ctg	ctg	gcg	cgg	gcc	acc	tcg	atc	ggc	gac	ctg	gtg	acg	ctg	336	
Arg	Lys	Leu	Leu	Ala	Arg	Ala	Thr	Ser	Ile	Gly	Asp	Leu	Val	Thr	Leu		
			100					105					110				
gag	agc	gag	gtg	gct	agg	cgg	gag	gcc	gac	ctc	gcc	tcg	ctg	gag	gcg	384	
Glu	Ser		Val	Ala	Arg	Arg	Glu	Ala	Asp	Leu	Ala	Ser	Leu	Glu	Ala		
			115				120					125					
aag	aag	cgc	cgg	ctg	gcc	gac	ctg	acc	tcg	ctc	tcc	acc	atc	acc	ctc	432	
Lys	Lys	Arg	Arg	Leu	Ala	Asp	Leu	Thr	Ser	Leu	Ser	Thr	Ile	Thr	Leu		
	130					135					140						
acc	ctg	gtc	ggc	ccg	gag	gcg	gag	gcc	cgg	gac	acc	gag	ccc	gac	acc	480	
Thr	Leu	Val	Gly	Pro	Glu	Ala	Glu	Ala	Arg	Asp	Thr	Glu	Pro	Asp	Thr		
	145				150				155						160		
ggc	ttc	gtg	gtc	ggc	ctg	cgc	ggc	ggc	tgg	acg	gcg	ttc	gtc	gcc	tcg	528	
Gly	Phe	Val	Val	Gly	Leu	Arg	Gly	Gly	Trp	Thr	Ala	Phe	Val	Ala	Ser		
				165				170						175			
ctg	ggc	gtg	ctg	ctc	acc	gtg	ctc	ggg	gcg	ctg	ctg	ccg	ttc	gcg	gtg	576	
Leu	Gly	Val	Leu	Leu	Thr	Val	Leu	Gly	Ala	Leu	Leu	Pro	Phe	Ala	Val		
			180					185					190				
gcc	ctc	ggc	gtg	ccg	gtg	gcg	gtg	ctg	ctt	gcg	gtg	ctg	cgg	cgg	cgc	624	
Ala	Leu	Gly	Val	Pro	Val	Ala	Val	Leu	Leu	Ala	Val	Leu	Arg	Arg	Arg		
		195					200					205					
cgg	cgt	cga	ccg	ccg	gcg	ccg	gcc	gtc	aac	gcg	ccg	ccg	cca	gtg	ccc	672	
Arg	Arg	Arg	Pro	Pro	Ala	Pro	Ala	Val	Asn	Ala	Pro	Pro	Pro	Val	Pro		
	210					215					220						
gca	gcg	cgg	tct	gca	cca											690	
Ala	Ala	Arg	Ser	Ala	Pro												
	225				230												

<210> 119

<211> 230

<212> PRT

<213> Micromonospora carbonacea

<220>

<223> evbO

<400> 119

Met	Arg	Val	Arg	Val	Asp	Asp	Val	Asp	Ala	Ala	Ala	Arg	Ser	Ala	Ile		
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Thr	Ala	Val	Thr	Gly	Val	Gly	Gly	Phe	Val	Gly	Gly	Asp	Glu	Arg	Ser		
			20					25					30				

Ser	Gly	Gly	Thr	Ala	Asp	Ala	Arg	Ala	Glu	Leu	Gln	Leu	Arg	Val	Pro		
		35					40					45					

Ala Glu Arg Phe Thr Ala Val Leu Glu Glu Leu Ala Arg Leu Gly Arg
50 55 60

Gln Glu Gln Arg Ala Ile Arg Thr Glu Asp Val Thr Glu Glu Thr Val
65 70 75 80

Asp Leu Asp Ala Arg Ile Ala Thr Gln Arg Ala Arg Val Glu Ser Gly
85 90 95

Arg Lys Leu Leu Ala Arg Ala Thr Ser Ile Gly Asp Leu Val Thr Leu
100 105 110

Glu Ser Glu Val Ala Arg Arg Glu Ala Asp Leu Ala Ser Leu Glu Ala
115 120 125

Lys Lys Arg Arg Leu Ala Asp Leu Thr Ser Leu Ser Thr Ile Thr Leu
130 135 140

Thr Leu Val Gly Pro Glu Ala Glu Ala Arg Asp Thr Glu Pro Asp Thr
145 150 155 160

Gly Phe Val Val Gly Leu Arg Gly Gly Trp Thr Ala Phe Val Ala Ser
165 170 175

Leu Gly Val Leu Leu Thr Val Leu Gly Ala Leu Leu Pro Phe Ala Val
180 185 190

Ala Leu Gly Val Pro Val Ala Val Leu Leu Ala Val Leu Arg Arg Arg
195 200 205

Arg Arg Arg Pro Pro Ala Pro Ala Val Asn Ala Pro Pro Pro Val Pro
210 215 220

Ala Ala Arg Ser Ala Pro
225 230

<210> 120
<211> 1260
<212> DNA
<213> Micromonospora carbonacea

<220>
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<222> (1)..(1260)

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Val Thr Ser Ala Leu Thr Leu Pro Asn Gly Ser His Leu Ala Ser Ser
1 5 10 15

gcc tgg ccg gag tcg ccg tcc ggg tcg cag cct ttg ccc ttc gag ctc 96
Ala Trp Pro Glu Ser Pro Ser Gly Ser Gln Pro Leu Pro Phe Glu Leu
20 25 30

gac cat ctg ctc gcc ctc cgg atg ccc ggc ctt atc gcc acc cgc cgg 144
Asp His Leu Leu Ala Leu Arg Met Pro Gly Leu Ile Ala Thr Arg Arg
35 40 45

cac atc cac tcc cac ccg gag ctc tcc ggc gag gag ttc gag acg gcg 192

His	Ile	His	Ser	His	Pro	Glu	Leu	Ser	Gly	Glu	Glu	Phe	Glu	Thr	Ala	
	50					55					60					
gcc	ctg	atc	gcc	cgc	gag	ctg	tgc	ctc	gcc	ggg	ttg	cgc	ccg	cgc	ctg	240
Ala	Leu	Ile	Ala	Arg	Glu	Leu	Ser	Leu	Ala	Gly	Leu	Arg	Pro	Arg	Leu	
65					70					75					80	
ctg	cca	aag	ggc	aac	ggg	gtc	atc	tgc	gac	atc	gac	ggc	cgc	ccc	gac	288
Leu	Pro	Lys	Gly	Asn	Gly	Val	Ile	Cys	Asp	Ile	Asp	Gly	Arg	Pro	Asp	
				85					90					95		
ggc	ccg	gtg	gtc	gcg	ctc	cgc	gcc	gac	atc	gac	gcg	ctg	ccg	ctg	acc	336
Gly	Pro	Val	Val	Ala	Leu	Arg	Ala	Asp	Ile	Asp	Ala	Leu	Pro	Leu	Thr	
			100					105					110			
gac	gtc	aag	gac	gtg	ccc	tac	cgg	tcc	acc	aag	gac	ggc	gtc	tgc	cac	384
Asp	Val	Lys	Asp	Val	Pro	Tyr	Arg	Ser	Thr	Lys	Asp	Gly	Val	Cys	His	
		115					120					125				
gcc	tgc	ggc	cac	gac	gtg	cac	acc	acc	gtg	ctg	ctc	ggc	gtc	ggc	gtg	432
Ala	Cys	Gly	His	Asp	Val	His	Thr	Thr	Val	Leu	Leu	Gly	Val	Gly	Val	
	130					135					140					
ctg	ctg	gcc	caa	ctc	gcc	aac	ctc	ggc	gaa	ttg	gac	ggc	cgg	gtc	cgg	480
Leu	Leu	Ala	Gln	Leu	Ala	Asn	Leu	Gly	Glu	Leu	Asp	Gly	Arg	Val	Arg	
145					150					155					160	
ctg	atc	ttc	cag	ccg	gcc	gag	gag	atc	ctg	ccc	tgc	ggc	tgc	ctg	gag	528
Leu	Ile	Phe	Gln	Pro	Ala	Glu	Glu	Ile	Leu	Pro	Cys	Gly	Ser	Leu	Glu	
				165					170					175		
gtc	atc	gag	gcc	ggc	ggc	ctc	gac	gac	gtc	gtg	cag	atc	ttc	gca	ctg	576
Val	Ile	Glu	Ala	Gly	Gly	Leu	Asp	Asp	Val	Val	Gln	Ile	Phe	Ala	Leu	
			180					185					190			
cac	tgc	gac	ccc	aac	cag	ccc	gtc	ggc	aag	gtc	ggc	ctg	cgg	gtc	ggc	624
His	Cys	Asp	Pro	Asn	Gln	Pro	Val	Gly	Lys	Val	Gly	Leu	Arg	Val	Gly	
		195					200					205				
ccg	atc	acc	gcc	gcc	gcc	gac	aac	gtc	acc	gtc	cgg	ctc	acc	ggc	ccc	672
Pro	Ile	Thr	Ala	Ala	Ala	Asp	Asn	Val	Thr	Val	Arg	Leu	Thr	Gly	Pro	
		210				215					220					
ggc	ggg	cac	acc	gct	cgc	ccg	cac	ctg	acc	gtc	gac	ctg	gtc	gac	gcg	720
Gly	Gly	His	Thr	Ala	Arg	Pro	His	Leu	Thr	Val	Asp	Leu	Val	Asp	Ala	
225					230					235					240	
ctc	ggc	cgg	ctg	gtc	acc	gag	gtg	cca	gcc	ctg	gtc	agc	cgc	cgg	gtg	768
Leu	Gly	Arg	Leu	Val	Thr	Glu	Val	Pro	Ala	Leu	Val	Ser	Arg	Arg	Val	
				245					250					255		
ccg	gcc	aac	agc	ggg	ctg	ctg	ctc	gtg	ttc	ggc	cac	gcc	tgc	gcc	ggc	816
Pro	Ala	Asn	Ser	Gly	Leu	Leu	Leu	Val	Phe	Gly	His	Ala	Ser	Ala	Gly	
			260					265					270			
acc	cgg	tac	aac	gtg	atc	ccg	tcc	gag	gcg	tcc	gcg	tcc	ggc	acc	ctg	864
Thr	Arg	Tyr	Asn	Val	Ile	Pro	Ser	Glu	Ala	Ser	Ala	Ser	Gly	Thr	Leu	
		275					280					285				
cgg	gtg	atg	gac	cgc	gac	acc	tgg	gac	cag	gcc	ccc	aag	atc	gtc	gct	912
Arg	Val	Met	Asp	Arg	Asp	Thr	Trp	Asp	Gln	Ala	Pro	Lys	Ile	Val	Ala	
	290					295					300					
cag	gtg	gtg	cgg	gac	gtc	atc	gcc	ccc	acc	ggc	gcc	acc	gtc	gac	ctg	960
Gln	Val	Val	Arg	Asp	Val	Ile	Ala	Pro	Thr	Gly	Ala	Thr	Val	Asp	Leu	

305		310		315		320	
gag tac cta cgc ggc cgg ccg ccg gtg acc aac gac gcc cgg gcg atc							1008
Glu Tyr Leu Arg Gly Arg Pro Pro Val Thr Asn Asp Ala Arg Ala Ile							
		325		330		335	
cag gtg ctc acg gcg gcg acc cac gcc gcg ctc ggc ccg gag ggg gtc							1056
Gln Val Leu Thr Ala Ala Thr His Ala Ala Leu Gly Pro Glu Gly Val							
		340		345		350	
gcg gag acc ccg cag agc atg ggc ggc gag gac ttc tcc tgg tac ctg							1104
Ala Glu Thr Pro Gln Ser Met Gly Gly Glu Asp Phe Ser Trp Tyr Leu							
		355		360		365	
gag tac gtc ccc ggc gcg ctg gcc cgc ctc ggc gtc ggc cgg tcc ggc							1152
Glu Tyr Val Pro Gly Ala Leu Ala Arg Leu Gly Val Gly Arg Ser Gly							
		370		375		380	
ccg aac gtc gac ctg cac cgg gcc tcg ttc gac gtc gac gag ggg gcc							1200
Pro Asn Val Asp Leu His Arg Ala Ser Phe Asp Val Asp Glu Gly Ala							
		385		390		395	400
atc gcg gtc ggc atc cgg gtc atg gtg cag acc gcg ctg cgg gca ctg							1248
Ile Ala Val Gly Ile Arg Val Met Val Gln Thr Ala Leu Arg Ala Leu							
		405		410		415	
gcg gcg gcg cgt							1260
Ala Ala Ala Arg							
		420					

<210> 121

<211> 420

<212> PRT

<213> Micromonospora carbonacea

<220>

<223> evbP

<400> 121

Val Thr Ser Ala Leu Thr Leu Pro Asn Gly Ser His Leu Ala Ser Ser	
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Ala Trp Pro Glu Ser Pro Ser Gly Ser Gln Pro Leu Pro Phe Glu Leu	
20 25 30	

Asp His Leu Leu Ala Leu Arg Met Pro Gly Leu Ile Ala Thr Arg Arg	
35 40 45	

His Ile His Ser His Pro Glu Leu Ser Gly Glu Glu Phe Glu Thr Ala	
50 55 60	

Ala Leu Ile Ala Arg Glu Leu Ser Leu Ala Gly Leu Arg Pro Arg Leu	
65 70 75 80	

Leu Pro Lys Gly Asn Gly Val Ile Cys Asp Ile Asp Gly Arg Pro Asp	
85 90 95	

Gly Pro Val Val Ala Leu Arg Ala Asp Ile Asp Ala Leu Pro Leu Thr	
100 105 110	

Asp Val Lys Asp Val Pro Tyr Arg Ser Thr Lys Asp Gly Val Cys His	
115 120 125	

Ala Cys Gly His Asp Val His Thr Thr Val Leu Leu Gly Val Gly Val	
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<210> 122
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<222> (1) .. (1581)

<220>

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<400> 122

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Met Ser Glu Pro Arg Ser Ser Glu Ser Gly Phe Pro Ile Lys Gly Val	
1 5 10 15	
tac acc cag agg gac ctg ccg gag ggt ctg ccc gag cgg ctg ggc gag	96
Tyr Thr Gln Arg Asp Leu Pro Glu Gly Leu Pro Glu Arg Leu Gly Glu	
20 25 30	
ccg ggg gag ttc ccg tac acc cgt ggg gtc tac tcc acc atg tac acc	144
Pro Gly Glu Phe Pro Tyr Thr Arg Gly Val Tyr Ser Thr Met Tyr Thr	
35 40 45	
tcg cgg ccg tgg acg atg cgc cag tac gcc ggc ttc ggc acc gcg acg	192
Ser Arg Pro Trp Thr Met Arg Gln Tyr Ala Gly Phe Gly Thr Ala Thr	
50 55 60	
gag agc aac gcg cgc tac cac cag ctc ctg cgc gcc ggc acc atg ggc	240
Glu Ser Asn Ala Arg Tyr His Gln Leu Leu Arg Ala Gly Thr Met Gly	
65 70 75 80	
ctc tcc gtc gct ttt gat ctg ccc acc cag atg ggg tac gac tcg gac	288
Leu Ser Val Ala Phe Asp Leu Pro Thr Gln Met Gly Tyr Asp Ser Asp	
85 90 95	
gac ccg atc gcc cac ggc gag gtc ggc aag gtc ggc gtc gcc atc gac	336
Asp Pro Ile Ala His Gly Glu Val Gly Lys Val Gly Val Ala Ile Asp	
100 105 110	
tcg atc gag gac atg cgg ctg ctg ttc cac ggc atc ccg ttg gac aag	384
Ser Ile Glu Asp Met Arg Leu Leu Phe His Gly Ile Pro Leu Asp Lys	
115 120 125	
gtt tcc acc tcg atg acg atc aac gcc ccg ggg tcg gtg ctg ctg ctg	432
Val Ser Thr Ser Met Thr Ile Asn Ala Pro Gly Ser Val Leu Leu Leu	
130 135 140	
ctc tac cag ctc gtc gcc gag gag gcg ggg gtg ccg ggc gcg gcg ctc	480
Leu Tyr Gln Leu Val Ala Glu Glu Ala Gly Val Pro Gly Ala Ala Leu	
145 150 155 160	
aac ggc acc atc cag aac gac atc ctc aag gag tac atc gcc cgg ggc	528
Asn Gly Thr Ile Gln Asn Asp Ile Leu Lys Glu Tyr Ile Ala Arg Gly	
165 170 175	
acg tac atc ttc ccg ccg aag ccc tcg ctg cgg ctg gtc gcc gac acg	576
Thr Tyr Ile Phe Pro Pro Lys Pro Ser Leu Arg Leu Val Ala Asp Thr	
180 185 190	
ttc gcc tac tgc cgg gcg gag gtg ccg aag tgg aac acc atc tcc atc	624
Phe Ala Tyr Cys Arg Ala Glu Val Pro Lys Trp Asn Thr Ile Ser Ile	
195 200 205	
tcc ggc tac cac atg gcc gag gcc ggc gcg tcg ccc gcg cag gag atc	672
Ser Gly Tyr His Met Ala Glu Ala Gly Ala Ser Pro Ala Gln Glu Ile	
210 215 220	
gcg ttc acg ctg gcc aac ggc gtc gag tac gtc cgg gcc gcg ctc gcc	720
Ala Phe Thr Leu Ala Asn Gly Val Glu Tyr Val Arg Ala Ala Leu Ala	
225 230 235 240	

gcc	ggg	ctg	gcg	gtg	gac	gac	ttc	gcg	ccc	cgg	ctg	tcg	ttc	ttc	ttc	768
Ala	Gly	Leu	Ala	Val	Asp	Asp	Phe	Ala	Pro	Arg	Leu	Ser	Phe	Phe	Phe	
				245					250						255	
gtc	gcc	cgg	acc	acc	ctg	ctg	gag	gag	gtc	gcg	aag	ttc	cgt	gcc	gcc	816
Val	Ala	Arg	Thr	Thr	Leu	Leu	Glu	Glu	Val	Ala	Lys	Phe	Arg	Ala	Ala	
			260					265					270			
cgg	cgg	atc	tgg	gcc	cgg	ctg	atg	cgc	gac	gag	ttc	ggc	gcg	aag	aac	864
Arg	Arg	Ile	Trp	Ala	Arg	Leu	Met	Arg	Asp	Glu	Phe	Gly	Ala	Lys	Asn	
		275					280					285				
ccg	aag	tcg	atg	atg	ctg	cgc	ttc	cac	acc	cag	acg	gcg	ggc	gtg	cag	912
Pro	Lys	Ser	Met	Met	Leu	Arg	Phe	His	Thr	Gln	Thr	Ala	Gly	Val	Gln	
	290					295					300					
ctc	acc	gcc	cag	cag	ccc	gag	gtg	aac	ctg	gtc	cgg	gtg	gcg	atc	cag	960
Leu	Thr	Ala	Gln	Gln	Pro	Glu	Val	Asn	Leu	Val	Arg	Val	Ala	Ile	Gln	
305					310					315					320	
ggg	ctg	ggc	gcg	gtg	ctc	ggc	ggc	acc	cag	tcg	cta	cac	acg	aac	agc	1008
Gly	Leu	Gly	Ala	Val	Leu	Gly	Gly	Thr	Gln	Ser	Leu	His	Thr	Asn	Ser	
				325					330					335		
ttc	gac	gag	gcc	atc	gcg	ctg	ccc	acc	gag	aag	gcc	gcc	cgg	ctg	gcg	1056
Phe	Asp	Glu	Ala	Ile	Ala	Leu	Pro	Thr	Glu	Lys	Ala	Ala	Arg	Leu	Ala	
			340					345					350			
ctg	cgc	acc	cag	cag	gtg	ctc	gcg	tac	gag	acg	gac	ctg	acc	gcc	acc	1104
Leu	Arg	Thr	Gln	Gln	Val	Leu	Ala	Tyr	Glu	Thr	Asp	Leu	Thr	Ala	Thr	
		355					360					365				
gtc	gac	ccg	ttc	gcc	ggg	tcg	tac	gtg	gtg	gag	gcg	atg	acc	gcc	gag	1152
Val	Asp	Pro	Phe	Ala	Gly	Ser	Tyr	Val	Val	Glu	Ala	Met	Thr	Ala	Glu	
	370					375					380					
atc	gag	gcg	gcg	gtg	gtg	gag	ctg	atg	gag	cgg	gtg	gcc	gac	cac	ggc	1200
Ile	Glu	Ala	Ala	Val	Val	Glu	Leu	Met	Glu	Arg	Val	Ala	Asp	His	Gly	
385					390					395					400	
tcg	gtg	gtc	gac	gcc	atc	gag	gcg	ggc	ttc	cag	aag	cgg	gag	atc	gag	1248
Ser	Val	Val	Asp	Ala	Ile	Glu	Ala	Gly	Phe	Gln	Lys	Arg	Glu	Ile	Glu	
				405					410					415		
cag	tcc	gcg	tac	cgg	atc	gcc	cag	gag	atc	gac	tcg	ggc	gag	cgg	gtg	1296
Gln	Ser	Ala	Tyr	Arg	Ile	Ala	Gln	Glu	Ile	Asp	Ser	Gly	Glu	Arg	Val	
			420					425					430			
gtg	gtc	ggc	ctc	aac	cgg	ttc	acg	gtc	gac	gcc	gac	gag	cgg	tac	gag	1344
Val	Val	Gly	Leu	Asn	Arg	Phe	Thr	Val	Asp	Ala	Asp	Glu	Pro	Tyr	Glu	
		435					440					445				
ccg	ctg	cgg	gtg	gac	ccg	acg	atc	gag	gct	gcc	cag	gcc	gag	cgg	ctg	1392
Pro	Leu	Arg	Val	Asp	Pro	Thr	Ile	Glu	Ala	Ala	Gln	Ala	Glu	Arg	Leu	
	450					455					460					
gcc	aag	ctg	cga	gtg	gag	cgc	gac	agc	gac	gcc	gtc	gag	cgc	gcg	ctg	1440
Ala	Lys	Leu	Arg	Val	Glu	Arg	Asp	Ser	Asp	Ala	Val	Glu	Arg	Ala	Leu	
465					470					475					480	
ggc	gag	ctg	cgg	gcc	gcc	gcc	gag	ggc	acg	gcg	aac	gtg	ctg	cac	ccg	1488
Gly	Glu	Leu	Arg	Ala	Ala	Ala	Glu	Gly	Thr	Ala	Asn	Val	Leu	His	Pro	
				485					490					495		

atg aag gag gcg ctg cgg gcc cgg gcc acg gtg ggc gag gtc tgt ggc 1536
 Met Lys Glu Ala Leu Arg Ala Arg Ala Thr Val Gly Glu Val Cys Gly
 500 505 510

acc ctg cgc cag gtg tgg ggg acg tac cgc ccc agc gac cgg ttc 1581
 Thr Leu Arg Gln Val Trp Gly Thr Tyr Arg Pro Ser Asp Arg Phe
 515 520 525

<210> 123

<211> 527

<212> PRT

<213> Micromonospora carbonacea

<220>

<223> evbQ

<400> 123

Met Ser Glu Pro Arg Ser Ser Glu Ser Gly Phe Pro Ile Lys Gly Val
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Tyr Thr Gln Arg Asp Leu Pro Glu Gly Leu Pro Glu Arg Leu Gly Glu
 20 25 30

Pro Gly Glu Phe Pro Tyr Thr Arg Gly Val Tyr Ser Thr Met Tyr Thr
 35 40 45

Ser Arg Pro Trp Thr Met Arg Gln Tyr Ala Gly Phe Gly Thr Ala Thr
 50 55 60

Glu Ser Asn Ala Arg Tyr His Gln Leu Leu Arg Ala Gly Thr Met Gly
 65 70 75 80

Leu Ser Val Ala Phe Asp Leu Pro Thr Gln Met Gly Tyr Asp Ser Asp
 85 90 95

Asp Pro Ile Ala His Gly Glu Val Gly Lys Val Gly Val Ala Ile Asp
 100 105 110

Ser Ile Glu Asp Met Arg Leu Leu Phe His Gly Ile Pro Leu Asp Lys
 115 120 125

Val Ser Thr Ser Met Thr Ile Asn Ala Pro Gly Ser Val Leu Leu Leu
 130 135 140

Leu Tyr Gln Leu Val Ala Glu Glu Ala Gly Val Pro Gly Ala Ala Leu
 145 150 155 160

Asn Gly Thr Ile Gln Asn Asp Ile Leu Lys Glu Tyr Ile Ala Arg Gly
 165 170 175

Thr Tyr Ile Phe Pro Pro Lys Pro Ser Leu Arg Leu Val Ala Asp Thr
 180 185 190

Phe Ala Tyr Cys Arg Ala Glu Val Pro Lys Trp Asn Thr Ile Ser Ile
 195 200 205

Ser Gly Tyr His Met Ala Glu Ala Gly Ala Ser Pro Ala Gln Glu Ile
 210 215 220

Ala Phe Thr Leu Ala Asn Gly Val Glu Tyr Val Arg Ala Ala Leu Ala
 225 230 235 240

Ala Gly Leu Ala Val Asp Asp Phe Ala Pro Arg Leu Ser Phe Phe Phe
 245 250 255

Val Ala Arg Thr Thr Leu Leu Glu Glu Val Ala Lys Phe Arg Ala Ala
 260 265 270
 Arg Arg Ile Trp Ala Arg Leu Met Arg Asp Glu Phe Gly Ala Lys Asn
 275 280 285
 Pro Lys Ser Met Met Leu Arg Phe His Thr Gln Thr Ala Gly Val Gln
 290 295 300
 Leu Thr Ala Gln Gln Pro Glu Val Asn Leu Val Arg Val Ala Ile Gln
 305 310 315 320
 Gly Leu Gly Ala Val Leu Gly Gly Thr Gln Ser Leu His Thr Asn Ser
 325 330 335
 Phe Asp Glu Ala Ile Ala Leu Pro Thr Glu Lys Ala Ala Arg Leu Ala
 340 345 350
 Leu Arg Thr Gln Gln Val Leu Ala Tyr Glu Thr Asp Leu Thr Ala Thr
 355 360 365
 Val Asp Pro Phe Ala Gly Ser Tyr Val Val Glu Ala Met Thr Ala Glu
 370 375 380
 Ile Glu Ala Ala Val Val Glu Leu Met Glu Arg Val Ala Asp His Gly
 385 390 395 400
 Ser Val Val Asp Ala Ile Glu Ala Gly Phe Gln Lys Arg Glu Ile Glu
 405 410 415
 Gln Ser Ala Tyr Arg Ile Ala Gln Glu Ile Asp Ser Gly Glu Arg Val
 420 425 430
 Val Val Gly Leu Asn Arg Phe Thr Val Asp Ala Asp Glu Pro Tyr Glu
 435 440 445
 Pro Leu Arg Val Asp Pro Thr Ile Glu Ala Ala Gln Ala Glu Arg Leu
 450 455 460
 Ala Lys Leu Arg Val Glu Arg Asp Ser Asp Ala Val Glu Arg Ala Leu
 465 470 475 480
 Gly Glu Leu Arg Ala Ala Ala Glu Gly Thr Ala Asn Val Leu His Pro
 485 490 495
 Met Lys Glu Ala Leu Arg Ala Arg Ala Thr Val Gly Glu Val Cys Gly
 500 505 510
 Thr Leu Arg Gln Val Trp Gly Thr Tyr Arg Pro Ser Asp Arg Phe
 515 520 525

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 <213> Micromonospora carbonacea

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 <222> (1)..(2088)

<220>
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<400> 124																
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1				5				10				15				
gcg	gtg	aag	gag	gtc	gtc	ctc	ccg	ccc	ggc	ctc	gcc	ccg	agc	gac	cgc	96
Ala	Val	Lys	Glu	Val	Val	Leu	Pro	Pro	Gly	Leu	Ala	Pro	Ser	Asp	Arg	
				20				25				30				
gac	gcc	atg	tac	gaa	cgc	acg	ctg	cgc	gag	gcc	cgc	gcg	gcg	gcg	gcc	144
Asp	Ala	Met	Tyr	Glu	Arg	Thr	Leu	Arg	Glu	Ala	Arg	Ala	Ala	Ala	Ala	
35				40				45								
atc	cag	cac	ccg	gcc	gtg	gtc	cag	gtg	tac	gac	gtg	gtc	acc	gag	ggc	192
Ile	Gln	His	Pro	Ala	Val	Val	Gln	Val	Tyr	Asp	Val	Val	Thr	Glu	Gly	
50				55				60								
ggc	cgc	ccc	tgg	atc	gtg	atg	gag	ctg	ctg	gac	gcc	cgc	agc	ctg	gcc	240
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Asp	Met	Val	Ile	Glu	Asp	Gly	Pro	Val	Ala	Pro	Arg	Ala	Val	Ala	Lys	
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atc	ggc	atc	gcc	ctg	ctc	ggc	gcg	ctg	gag	gtg	gcc	cac	gcg	atc	ggc	336
Ile	Gly	Ile	Ala	Leu	Leu	Gly	Ala	Leu	Glu	Val	Ala	His	Ala	Ile	Gly	
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gtg	ctg	cac	cgc	gac	gtg	aag	ccg	gcc	aac	gtg	ctg	atc	tgc	acc	gac	384
Val	Leu	His	Arg	Asp	Val	Lys	Pro	Ala	Asn	Val	Leu	Ile	Cys	Thr	Asp	
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ggc	cgg	tgc	gtg	ctg	acc	gac	ttc	ggg	gtg	gcc	aag	ctc	ccc	acc	gac	432
Gly	Arg	Cys	Val	Leu	Thr	Asp	Phe	Gly	Val	Ala	Lys	Leu	Pro	Thr	Asp	
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Ser	Pro	Glu	Arg	Ala	Met	Gly	Gln	Glu	Phe	Gly	Pro	Pro	Ser	Asp	Leu	
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Phe	Ser	Leu	Gly	Val	Thr	Leu	Tyr	Thr	Ala	Val	Glu	Gly	Arg	Pro	Pro	
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ttc	gac	agg	ggc	gac	ccg	atc	gag	acc	atg	cac	gcc	gtg	gtc	gag	gac	624
Phe	Asp	Arg	Gly	Asp	Pro	Ile	Glu	Thr	Met	His	Ala	Val	Val	Glu	Asp	
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Pro	Pro	Ala	Thr	Pro	Gln	Arg	Ser	Gly	Pro	Leu	Thr	Arg	Val	Leu	Met	
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Thr	Ala	Val	Asn	Ser	Val	Thr	Asp	Pro	Tyr	Ala	Val	Val	Pro	Val	Lys	
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Gln	Arg	Pro	Ala	Val	Ala	Pro	Pro	Pro	Ser	Ala	Ala	Glu	Pro	Lys	Pro	
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Ser	Gly	Gln	Ile	Gly	Gly	Arg	Ala	Met	Leu	Ala	Pro	Gly	Glu	Ser	Leu	
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Thr	Asp	Arg	Leu	Ala	Ala	Leu	Arg	Arg	Gly	Glu	Lys	Thr	Arg	Lys	Arg	
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aag	acg	acg	acc	gcc	gcc	gcg	ctg	gac	gac	acc	agc	gcc	gac	gcg	ctt	1008
Lys	Thr	Thr	Thr	Ala	Ala	Ala	Leu	Asp	Asp	Thr	Ser	Ala	Asp	Ala	Leu	
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Ala	Gly	Pro	Leu	His	Thr	Pro	Thr	Gly	Ala	Met	Pro	Ala	Pro	Pro	Pro	
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	370					375					380					
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Pro	Asp	Ala	Thr	Gln	Arg	Val	Ser	His	Gly	Ser	Gly	Pro	Ser	Glu	Ala	
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Thr	Gln	Arg	Val	Pro	Tyr	Gly	Gly	Gly	Ser	Ala	Asp	Ala	Thr	Gln	Gln	
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Val	Pro	Phe	Gly	Arg	Arg	Pro	Asp	Ala	Thr	Gln	Arg	Val	Pro	Tyr	Gly	
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Ser	Gln	Pro	Gly	Ala	Thr	Gln	Pro	Val	Pro	Gly	Phe	Gly	Ala	Ser	Pro	
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Asp	Ala	Thr	Gln	Arg	Val	Gly	Gly	Ala	Tyr	Gly	Gly	Gly	Gln	Trp	Ser	
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Val	Pro	Gly	Thr	Gly	Gln	Pro	Trp	Ala	Thr	Pro	Ala	Thr	Ala	Pro	Ala	
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Pro	Ala	Thr	Ala	Gly	Gly	Gly	Gly	Val	Gly	Arg	Leu	Val	Ala	Thr	Val	
				485					490						495	
aag	ggc	tgg	ccg	cgc	aag	gtg	cag	ctc	gcc	gcg	gcc	ggc	ggc	gtc	gcc	1536
Lys	Gly	Trp	Pro	Arg	Lys	Val	Gln	Leu	Ala	Ala	Ala	Gly	Gly	Val	Ala	
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Glu Gln Pro Thr Thr Pro Gln Gly Gln Pro Ser Ala Gly Ala Pro Ala	
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ggc ccc ggg gtg gag atg cag gag cag tcg gcc aag ggc gtc acg gtg	1680
Gly Pro Gly Val Glu Met Gln Glu Gln Ser Ala Lys Gly Val Thr Val	
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Gln Val Pro Lys Gly Trp Glu Arg Arg Ser Ala Asp Gly Gly Val Trp	
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Val Asp Tyr Ile Asp Pro Glu Asp Asn Ser Arg Lys Val Arg Ile Leu	
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Ala Glu Arg Trp Ser Gly Thr Ser Thr Arg Trp Ala Glu Thr Ala Ala	
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Asn Gly Leu Arg Thr Arg Ser Ala Ser Cys Gln Lys Pro Tyr Asn Gln	
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Val Ser Met Thr Glu Gln Glu Leu Asp Gly Lys Ala Ala Ala Glu Phe	
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Glu Tyr Thr Cys Gly Asp Gly Glu Gly Lys Arg His Gly Val Trp Arg	
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Gly Val Val His Glu Gly Lys Val Tyr Ser Phe Tyr Leu Ser Ser Thr	
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Asp Ala Arg Phe Ala Glu Ser Lys Pro Ile Phe Asp Gln Met Val Ala	
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Asp	Met	Val	Ile	Glu	Asp	Gly	Pro	Val	Ala	Pro	Arg	Ala	Val	Ala	Lys
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Ile	Gly	Ile	Ala	Leu	Leu	Gly	Ala	Leu	Glu	Val	Ala	His	Ala	Ile	Gly
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Val	Leu	His	Arg	Asp	Val	Lys	Pro	Ala	Asn	Val	Leu	Ile	Cys	Thr	Asp
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Phe	Ser	Leu	Gly	Val	Thr	Leu	Tyr	Thr	Ala	Val	Glu	Gly	Arg	Pro	Pro
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Arg	Ala	Met	Leu	Arg	Glu	Leu	Leu	Ala	Gly	Pro	Leu	Thr	Ser	Thr	Ala
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 Thr Gln Arg Val Pro Tyr Gly Gly Gly Ser Ala Asp Ala Thr Gln Gln
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 Ser Gln Pro Gly Ala Thr Gln Pro Val Pro Gly Phe Gly Ala Ser Pro
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 Asp Ala Thr Gln Arg Val Gly Gly Ala Tyr Gly Gly Gly Gln Trp Ser
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 Val Pro Gly Thr Gly Gln Pro Trp Ala Thr Pro Ala Thr Ala Pro Ala
 465 470 475 480
 Pro Ala Thr Ala Gly Gly Gly Gly Val Gly Arg Leu Val Ala Thr Val
 485 490 495
 Lys Gly Trp Pro Arg Lys Val Gln Leu Ala Ala Ala Gly Gly Val Ala
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 Val Leu Leu Leu Ile Gly Val Phe Ala Leu Phe Gly Gly Asp Asp Pro
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 Gly Pro Gly Val Glu Met Gln Glu Gln Ser Ala Lys Gly Val Thr Val
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 Gln Val Pro Lys Gly Trp Glu Arg Arg Ser Ala Asp Gly Gly Val Trp
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 Asn Gly Leu Arg Thr Arg Ser Ala Ser Cys Gln Lys Pro Tyr Asn Gln
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 Val Ser Met Thr Glu Gln Glu Leu Asp Gly Lys Ala Ala Ala Glu Phe
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 Glu Tyr Thr Cys Gly Asp Gly Glu Gly Lys Arg His Gly Val Trp Arg
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 Gly Val Val His Glu Gly Lys Val Tyr Ser Phe Tyr Leu Ser Ser Thr
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Leu Arg Asp Arg Ala Arg Arg Trp Leu Asp Asp Asp Pro Asp Pro Ala	
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Thr Arg Asp Glu Leu Glu Ala Val Leu Asp Gly Leu Pro Ala Ser Ala	
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Ala Glu Leu Ala Asp Arg Phe Ala Gly Pro Leu Thr Phe Gly Thr Ala	
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Asp Ala Thr Gly Pro Leu Val Ile Gly Tyr Asp Ala Arg His Gly Ser	
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His Asn Pro Pro Gln Asp Asn Gly Tyr Lys Val Tyr Leu Gly Ala Gln	
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Leu Gly Gly Glu Leu Gly Ala Gly Ala Gln Ile Val Pro Pro Ala Asp	
180 185 190	
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Thr Gly Ile Glu Ala Ala Ile Arg Ala Val Gly Pro Leu Ala Asp Val	
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Pro Leu Gly Pro Ala Gly Gln Val Val Gly Asp Asp Val Val Val Ser	
210 215 220	

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Thr	Ala	Ala	Phe	Ala	Arg	Ala	Gly	Phe	Gly	Ile	Pro	Gly	Val	Val	Pro	
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Asp	Gly	Ile	Thr	Ala	Ala	Leu	Thr	Val	Ala	Glu	Leu	Ala	Ala	Gly	Leu	
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Lys	Ala	Gln	Gly	Arg	Thr	Leu	Thr	Asp	Arg	Leu	Asp	Glu	Leu	Ala	Ala	
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 Thr Thr Leu Leu Gly Arg Pro Val Thr Glu Ala Arg Asp Leu Leu Pro
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Gly Leu Arg Gly Pro Leu Arg Ala Gly Pro Asn Gly Met Asn Leu Ala
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Val Val Thr Gln Ala Ala Ala Gly Leu Val Ala Trp Leu Ala Ala Gln
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Asp Ala Thr Gly Pro Leu Val Ile Gly Tyr Asp Ala Arg His Gly Ser
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Arg Glu Phe Ala Glu Arg Thr Ala Gln Val Ala Thr Gly Ala Gly Arg
 115 120 125

Pro Ala Leu Leu Leu Pro Arg Pro Leu Pro Thr Pro Val Leu Ala Tyr
 130 135 140

Ala Val Arg Gln Leu Asp Ala Ala Ala Gly Val Met Val Thr Ala Ser
 145 150 155 160

His Asn Pro Pro Gln Asp Asn Gly Tyr Lys Val Tyr Leu Gly Ala Gln

165					170					175							
Leu	Gly	Gly	Glu	180	Leu	Gly	Ala	Gly	185	Gln	Ile	Val	Pro	190	Pro	Ala	Asp
Thr	Gly	Ile	Glu	195	Ala	Ala	Ile	Arg	200	Ala	Val	Gly	Pro	205	Leu	Ala	Asp
Pro	Leu	Gly	Pro	210	Ala	Gly	Gln	Val	215	Val	Gly	Asp	Asp	220	Val	Val	Ser
Tyr	Val	Asp	Arg	225	Ala	Ala	Ala	Val	230	Val	Asp	Pro	Ala	235	Gly	Pro	Ser
Leu	Lys	Val	Ala	245	Tyr	Thr	Pro	Leu	250	His	Gly	Val	Gly	255	Ala	Ala	Leu
Thr	Ala	Ala	Phe	260	Ala	Arg	Ala	Gly	265	Phe	Gly	Ile	Pro	270	Gly	Val	Pro
Glu	Gln	Ala	Val	275	Pro	Asp	Pro	Asp	280	Phe	Arg	Thr	Val	285	Ser	Phe	Asn
Pro	Glu	Glu	Pro	290	Gly	Ala	Val	Asp	295	Leu	Leu	Val	Ala	300	Leu	Ala	Arg
Thr	Gly	Ala	Asp	305	Leu	Ala	Ile	Ala	310	Asn	Asp	Pro	Asp	315	Ala	Asp	Cys
Ala	Val	Ala	Val	325	Arg	Asp	Gly	Arg	330	Ala	Ala	Gly	Pro	335	Ala	Pro	Ser
Gly	Gly	Ala	Trp	340	Arg	Met	Leu	Arg	345	Gly	Asp	Glu	Val	350	Gly	Ala	Leu
Ala	Asp	His	Leu	355	Met	Arg	Arg	Gly	360	Val	His	Gly	Leu	365	Tyr	Ala	Thr
Ile	Val	Ser	Ser	370	Ser	Leu	Leu	Arg	375	Ala	Met	Cys	Ala	380	Ala	Arg	Leu
Pro	Tyr	Asp	Glu	385	Thr	Leu	Thr	Gly	390	Phe	Lys	Trp	Ile	395	Val	Arg	Gly
Gly	Gly	Pro	Leu	405	Gly	Glu	Ala	Gly	410	Ser	Asp	Pro	Leu	415	Val	Phe	Tyr
Glu	Glu	Ala	Leu	420	Gly	Tyr	Cys	Val	425	Ala	Pro	Glu	His	430	Val	Arg	Lys
Asp	Gly	Ile	Thr	435	Ala	Ala	Leu	Thr	440	Val	Ala	Glu	Leu	445	Ala	Ala	Leu
Lys	Ala	Gln	Gly	450	Arg	Thr	Leu	Thr	455	Asp	Arg	Leu	Asp	460	Glu	Leu	Ala
Glu	Phe	Gly	Val	465	His	His	Thr	Asp	470	Gln	Leu	Ser	Val	475	Arg	Val	Asp
Leu	Arg	Ile	Ile	485	Ala	Asp	Ala	Met	490	Ala	Arg	Val	Arg	495	Ala	Ala	Pro
Thr	Thr	Leu	Leu	500	Gly	Arg	Pro	Val	505	Thr	Glu	Ala	Arg	510	Asp	Leu	Pro

Glu Ala Asp Val Val Ile Leu Arg Thr Asp Gly Ala Arg Val Val Ile
 515 520 525

Arg Pro Ser Gly Thr Glu Pro Lys Leu Lys Ala Tyr Leu Glu Val Val
 530 535 540

Glu Pro Val Ala Asp Gly Asp Val Pro Ala Ala Arg Thr Arg Ala Ala
 545 550 555 560

Ala Thr Leu Ala Ala Leu Arg Thr Glu Ile Ala Ala Leu Val Gln Gly
 565 570 575

<210> 128
 <211> 858
 <212> DNA
 <213> Micromonospora carbonacea

<220>
 <221> CDS
 <222> (1) .. (858)

<220>
 <223> evbT

<400> 128
 gtg ccg cga cgg cag ctc ggc agg ctg ctc acc cag ctc cgc gag agc 48
 Val Pro Arg Arg Gln Leu Gly Arg Leu Leu Thr Gln Leu Arg Glu Ser
 1 5 10 15

gcc cat atc agc atc gac gcg gcg gcc ggc gag ctg gac tgc tcg cgg 96
 Ala His Ile Ser Ile Asp Ala Ala Ala Gly Glu Leu Asp Cys Ser Arg
 20 25 30

cag aag ctc tgg cgg atc gag cgg ggg ctg acc tcg gcc aag aca ccg 144
 Gln Lys Leu Trp Arg Ile Glu Arg Gly Leu Thr Ser Ala Lys Thr Pro
 35 40 45

gac gtc cgg gtg ctc tgc gag ctg tac cgg gcc acg ccc gac cag gcg 192
 Asp Val Arg Val Leu Cys Glu Leu Tyr Arg Ala Thr Pro Asp Gln Ala
 50 55 60

agc gtg ctg ctc ggg ctc gcc gag gtg agc cgg gcc gag ggg tgg tgg 240
 Ser Val Leu Leu Gly Leu Ala Glu Val Ser Arg Ala Glu Gly Trp Trp
 65 70 75 80

cac gcc cac ggc agc tcc gtg ccg gcc tgg ttc tcg ctc tac gtc ggc 288
 His Ala His Gly Ser Ser Val Pro Ala Trp Phe Ser Leu Tyr Val Gly
 85 90 95

ctg gag aac gtc gcg agc agc att cgg cac tac aac gcg gag ctg gtg 336
 Leu Glu Asn Val Ala Ser Ser Ile Arg His Tyr Asn Ala Glu Leu Val
 100 105 110

ccg ggg ctg ttg cag acc ccc ggc tac gcc acc gcg ctc ttc gag cac 384
 Pro Gly Leu Leu Gln Thr Pro Gly Tyr Ala Thr Ala Leu Phe Glu His
 115 120 125

aac cgg ccc gag ctg ggc gag gag gag cga aag aag gcg gtg ggc ttc 432
 Asn Arg Pro Glu Leu Gly Glu Glu Glu Arg Lys Lys Ala Val Gly Phe
 130 135 140

cgg act cag cgg cag ggg ctg ctg gcc cgg cgg ctg ccc ccg gcc ccc 480
 Arg Thr Gln Arg Gln Gly Leu Leu Ala Arg Arg Leu Pro Pro Ala Pro

145	150	155	160	
gag ctg acc gtg atc ctc agc gag gcg gtg ctg cgc cgc ccg gtg ccg				528
Glu Leu Thr Val Ile Leu Ser Glu Ala Val Leu Arg Arg Pro Val Pro	165	170	175	
ggc cga tcg gtg atg gcc gac cag ctc cgg cac ctg ctg gcc gtc ggc				576
Gly Arg Ser Val Met Ala Asp Gln Leu Arg His Leu Leu Ala Val Gly	180	185	190	
gaa cgg cac aac atc acc gta cgg gtg ctg ccg ctg gcc gcc ggg ccg				624
Glu Arg His Asn Ile Thr Val Arg Val Leu Pro Leu Ala Ala Gly Pro	195	200	205	
ccg ctg gcc gcc gag gcc ggc acg ttc gtg ctg ctc gac ttc ccg ctc				672
Pro Leu Ala Ala Glu Ala Gly Thr Phe Val Leu Leu Asp Phe Pro Leu	210	215	220	
tcg gcg ctc ggc agc ccg acc gag ccg ccg acc gtc tac gtc gag ggg				720
Ser Ala Leu Gly Ser Pro Thr Glu Pro Pro Thr Val Tyr Val Glu Gly	225	230	235	240
ctc acc ggc gcg ctc tac ctc gac cag ccg acg gag atc gcc gcg tac				768
Leu Thr Gly Ala Leu Tyr Leu Asp Gln Pro Thr Glu Ile Ala Ala Tyr	245	250	255	
gaa cgg gtc tgg agg ggt ctg gat tcg ctc gcc ctc ggc gcg cga caa				816
Glu Arg Val Trp Arg Gly Leu Asp Ser Leu Ala Leu Gly Ala Arg Gln	260	265	270	
tca gcg gag ctg atc gat gcc atc cgg gga gag tgc tat gag				858
Ser Ala Glu Leu Ile Asp Ala Ile Arg Gly Glu Cys Tyr Glu	275	280	285	

<210> 129

<211> 286

<212> PRT

<213> Micromonospora carbonacea

<220>

<223> evbT

<400> 129

Val	Pro	Arg	Arg	Gln	Leu	Gly	Arg	Leu	Leu	Thr	Gln	Leu	Arg	Glu	Ser
1				5					10					15	

Ala	His	Ile	Ser	Ile	Asp	Ala	Ala	Ala	Gly	Glu	Leu	Asp	Cys	Ser	Arg
			20					25					30		

Gln	Lys	Leu	Trp	Arg	Ile	Glu	Arg	Gly	Leu	Thr	Ser	Ala	Lys	Thr	Pro
		35					40					45			

Asp	Val	Arg	Val	Leu	Cys	Glu	Leu	Tyr	Arg	Ala	Thr	Pro	Asp	Gln	Ala
	50					55					60				

Ser	Val	Leu	Leu	Gly	Leu	Ala	Glu	Val	Ser	Arg	Ala	Glu	Gly	Trp	Trp
65					70					75				80	

His	Ala	His	Gly	Ser	Ser	Val	Pro	Ala	Trp	Phe	Ser	Leu	Tyr	Val	Gly
				85					90					95	

Leu	Glu	Asn	Val	Ala	Ser	Ser	Ile	Arg	His	Tyr	Asn	Ala	Glu	Leu	Val
			100					105					110		

Pro Gly Leu Leu Gln Thr Pro Gly Tyr Ala Thr Ala Leu Phe Glu His
115 120 125

Asn Arg Pro Glu Leu Gly Glu Glu Arg Lys Lys Ala Val Gly Phe
130 135 140

Arg Thr Gln Arg Gln Gly Leu Leu Ala Arg Arg Leu Pro Pro Ala Pro
145 150 155 160

Glu Leu Thr Val Ile Leu Ser Glu Ala Val Leu Arg Arg Pro Val Pro
165 170 175

Gly Arg Ser Val Met Ala Asp Gln Leu Arg His Leu Leu Ala Val Gly
180 185 190

Glu Arg His Asn Ile Thr Val Arg Val Leu Pro Leu Ala Ala Gly Pro
195 200 205

Pro Leu Ala Ala Glu Ala Gly Thr Phe Val Leu Leu Asp Phe Pro Leu
210 215 220

Ser Ala Leu Gly Ser Pro Thr Glu Pro Pro Thr Val Tyr Val Glu Gly
225 230 235 240

Leu Thr Gly Ala Leu Tyr Leu Asp Gln Pro Thr Glu Ile Ala Ala Tyr
245 250 255

Glu Arg Val Trp Arg Gly Leu Asp Ser Leu Ala Leu Gly Ala Arg Gln
260 265 270

Ser Ala Glu Leu Ile Asp Ala Ile Arg Gly Glu Cys Tyr Glu
275 280 285

<210> 130
<211> 606
<212> DNA
<213> Micromonospora carbonacea

<220>
<221> CDS
<222> (1)..(606)

<220>
<223> evbU

<400> 130
atg ccg cgg atc agc ctc gac ctc ggg atg gcc gcc gcc gtc ctg atc 48
Met Pro Arg Ile Ser Leu Asp Leu Gly Met Ala Ala Ala Val Leu Ile
1 5 10 15

gag ctg gcc ctc gcc ggc cgg gtc gcg tac gtc gat ggg aac ctg gtg 96
Glu Leu Ala Leu Ala Gly Arg Val Ala Tyr Val Asp Gly Asn Leu Val
20 25 30

gtc acg gac ccc gcg ccc acc ggc gaa ccg atc ctg gac gag gtc ctg 144
Val Thr Asp 35 Pro Ala Pro Thr Gly Glu Pro Ile Leu Asp 45 Glu Val Leu

ggc cgg atg gcc gcc gac acg ccg cac acc ccg tcc tcc tgg gtg cag 192
Gly Arg Met Ala Ala Asp Thr Pro His Thr Pro Ser Ser Trp Val Gln
50 55 60

cgg ctg cgc cac ggc ctg cgc gac cgg atc ctc ggc gac ctg gtc gcc 240

Arg 65	Leu	Arg	His	Gly	Leu 70	Arg	Asp	Arg	Ile	Leu 75	Gly	Asp	Leu	Val	Ala 80	
cgg	ggc	gtg	gtg	cgc	gac	gtc	gag	gag	acc	gag	ctg	ggc	ttc	atc	cac	288
Arg	Gly	Val	Val	Arg 85	Asp	Val	Glu	Glu	Thr 90	Glu	Leu	Gly	Phe	Ile 95	His	
gtg	cac	cgc	tac	ccg	acg	gcg	gac	gcc	acc	gtg	gag	gag	gac	tcc	cgg	336
Val	His	Arg	Tyr 100	Pro	Thr	Ala	Asp	Ala 105	Thr	Val	Glu	Glu	Asp 110	Ser	Arg	
cgg	cgg	ctg	gcc	gag	gcg	ctg	gcc	ggc	ggg	cag	atc	ccc	gac	gag	gcg	384
Arg	Arg	Leu 115	Ala	Glu	Ala	Leu	Ala 120	Gly	Gly	Gln	Ile	Pro 125	Asp	Glu	Ala	
acg	gcg	gcg	ctg	gcc	acc	ctg	gtc	gcg	gtg	ctc	cgg	atg	gag	ccg	gcg	432
Thr	Ala	Ala	Leu	Ala	Thr	Leu 135	Val	Ala	Val	Leu	Arg	Met 140	Glu	Pro	Ala	
ctc	ggc	ctg	acc	ggc	gac	gcc	gcc	gtc	gac	gcc	cgg	cgt	cgg	ctg	gag	480
Leu	Gly	Leu	Thr	Gly	Asp 150	Ala	Ala	Val	Asp	Ala 155	Arg	Arg	Arg	Leu	Glu 160	
gag	atc	gcg	ggc	ggg	gcc	ggc	ttc	tcc	ggc	acc	gtc	agc	ctg	gac	gac	528
Glu	Ile	Ala	Gly	Gly 165	Ala	Gly	Phe	Ser	Gly 170	Thr	Val	Ser	Leu	Asp 175	Asp	
tcg	gtg	gtc	cgc	ccc	tcg	gtg	gcc	ctg	gtc	gtc	acc	gcc	ctg	ggc	aag	576
Ser	Val	Val	Arg 180	Pro	Ser	Val	Ala	Leu 185	Val	Val	Thr	Ala	Leu 190	Gly	Lys	
gcg	gtc	gac	gcc	gcc	ctc	ggc	aag	cgc	gcc							606
Ala	Val	Asp 195	Ala	Ala	Leu	Gly	Lys 200	Arg	Ala							

<210> 131

<211> 202

<212> PRT

<213> Micromonospora carbonacea

<220>

<223> evbU

<400> 131

Met 1	Pro	Arg	Ile	Ser 5	Leu	Asp	Leu	Gly	Met 10	Ala	Ala	Ala	Val	Leu 15	Ile
Glu	Leu	Ala	Leu	Ala	Gly	Arg	Val	Ala	Tyr	Val	Asp	Gly	Asn 30	Leu	Val
			20					25							
Val	Thr	Asp 35	Pro	Ala	Pro	Thr	Gly	Glu	Pro	Ile	Leu	Asp 45	Glu	Val	Leu
							40								
Gly	Arg	Met	Ala	Ala	Asp	Thr	Pro	His	Thr	Pro	Ser	Ser	Trp	Val	Gln
		50				55					60				
Arg 65	Leu	Arg	His	Gly	Leu 70	Arg	Asp	Arg	Ile	Leu 75	Gly	Asp	Leu	Val	Ala 80
Arg	Gly	Val	Val	Arg 85	Asp	Val	Glu	Glu	Thr 90	Glu	Leu	Gly	Phe	Ile 95	His
Val	His	Arg	Tyr	Pro	Thr	Ala	Asp	Ala	Thr	Val	Glu	Glu	Asp 110	Ser	Arg
			100					105							

Arg Arg Leu Ala Glu Ala Leu Ala Gly Gly Gln Ile Pro Asp Glu Ala
 115 120 125
 Thr Ala Ala Leu Ala Thr Leu Val Ala Val Leu Arg Met Glu Pro Ala
 130 135 140
 Leu Gly Leu Thr Gly Asp Ala Ala Val Asp Ala Arg Arg Arg Leu Glu
 145 150 155 160
 Glu Ile Ala Gly Gly Ala Gly Phe Ser Gly Thr Val Ser Leu Asp Asp
 165 170 175
 Ser Val Val Arg Pro Ser Val Ala Leu Val Val Thr Ala Leu Gly Lys
 180 185 190
 Ala Val Asp Ala Ala Leu Gly Lys Arg Ala
 195 200

<210> 132
 <211> 579
 <212> DNA
 <213> Micromonospora carbonacea

<220>
 <221> CDS
 <222> (1)..(579)

<220>
 <223> evbV

<400> 132
 atg cgg gac gcg cgc acc gac tcc tcc aac ttc cgg gcc gcg ctg cac 48
 Met Arg Asp Ala Arg Thr Asp Ser Ser Asn Phe Arg Ala Ala Leu His
 1 5 10 15
 gag ctc acc acc atg ctc gtg tac gag gcc gcc cgc tcc ttc ccc gtc 96
 Glu Leu Thr Thr Met Leu Val Tyr Glu Ala Ala Arg Ser Phe Pro Val
 20 25 30
 gag aag tac ccg gtg cag acc ccc gtc acc gac gcc gag ggc acc cgg 144
 Glu Lys Tyr Pro Val Gln Thr Pro Val Thr Asp Ala Glu Gly Thr Arg
 35 40 45
 ctg gcc aac ccg ccg ctg ctg gta ccc gtg ctg cgg gcc ggt ctc ggc 192
 Leu Ala Asn Pro Pro Leu Leu Val Pro Val Leu Arg Ala Gly Leu Gly
 50 55 60
 atg gcc gac gcc gcg ctc gcc ctg ctc ccc gag tcg tcc atg ggc ttc 240
 Met Ala Asp Ala Ala Leu Ala Leu Leu Pro Glu Ser Ser Met Gly Phe
 65 70 75 80
 gtc ggc ctc gcc cgc gac gag gag acg tac gag ccg cgc gcg tac atg 288
 Val Gly Leu Ala Arg Asp Glu Glu Thr Tyr Glu Pro Arg Ala Tyr Met
 85 90 95
 gag tcg ctg ccg cgc gac ctc gcc ggc ctg ccc gtg ctg gtc ctc gac 336
 Glu Ser Leu Pro Arg Asp Leu Ala Gly Leu Pro Val Leu Val Leu Asp
 100 105 110
 ccg atg ctg gcc acc ggc ggc tcc ctg gag cac tgc tgc cgg ctg ctg 384
 Pro Met Leu Ala Thr Gly Gly Ser Leu Glu His Cys Cys Arg Leu Leu
 115 120 125

gcc gag cgg ggc tgc acc gac atc acc gtg ctc tgc gtg ctc gcc gcg 432
 Ala Glu Arg Gly Cys Thr Asp Ile Thr Val Leu Cys Val Leu Ala Ala
 130 135 140

ccc gtc ggc atc gcc cgg ctg gag cag tcc ggc ctg ccg ctg cgc ctc 480
 Pro Val Gly Ile Ala Arg Leu Glu Gln Ser Gly Leu Pro Leu Arg Leu
 145 150 155 160

gtc acc gcc gcg atc gac gag agc ctc aac gac cgg atg ttc atc gtg 528
 Val Thr Ala Ala Ile Asp Glu Ser Leu Asn Asp Arg Met Phe Ile Val
 165 170 175

ccg ggc ctc ggc gac gcc ggc gac cgc cag ttc ggc ggt atg ccc cgc 576
 Pro Gly Leu Gly Asp Ala Gly Asp Arg Gln Phe Gly Gly Met Pro Arg
 180 185 190

ttc 579
 Phe

<210> 133
 <211> 193
 <212> PRT
 <213> *Micromonospora carbonacea*

<220>
 <223> evbV

<400> 133
 Met Arg Asp Ala Arg Thr Asp Ser Ser Asn Phe Arg Ala Ala Leu His
 1 5 10 15
 Glu Leu Thr Thr Met Leu Val Tyr Glu Ala Ala Arg Ser Phe Pro Val
 20 25 30
 Glu Lys Tyr Pro Val Gln Thr Pro Val Thr Asp Ala Glu Gly Thr Arg
 35 40 45
 Leu Ala Asn Pro Pro Leu Leu Val Pro Val Leu Arg Ala Gly Leu Gly
 50 55 60
 Met Ala Asp Ala Ala Leu Ala Leu Leu Pro Glu Ser Ser Met Gly Phe
 65 70 75 80
 Val Gly Leu Ala Arg Asp Glu Glu Thr Tyr Glu Pro Arg Ala Tyr Met
 85 90 95
 Glu Ser Leu Pro Arg Asp Leu Ala Gly Leu Pro Val Leu Val Leu Asp
 100 105 110
 Pro Met Leu Ala Thr Gly Gly Ser Leu Glu His Cys Cys Arg Leu Leu
 115 120 125
 Ala Glu Arg Gly Cys Thr Asp Ile Thr Val Leu Cys Val Leu Ala Ala
 130 135 140
 Pro Val Gly Ile Ala Arg Leu Glu Gln Ser Gly Leu Pro Leu Arg Leu
 145 150 155 160
 Val Thr Ala Ala Ile Asp Glu Ser Leu Asn Asp Arg Met Phe Ile Val
 165 170 175
 Pro Gly Leu Gly Asp Ala Gly Asp Arg Gln Phe Gly Gly Met Pro Arg
 180 185 190

Phe

<210> 134
 <211> 1014
 <212> DNA
 <213> Micromonospora carbonacea

<220>
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 <222> (1)..(1014)

<220>
 <223> evbW

<400> 134
 atg acg gcg aca gcg acg tcg gcc cgg tcg gac ctc tcc gag ctg gga 48
 Met Thr Ala Thr Ala Thr Ser Ala Arg Ser Asp Leu Ser Glu Leu Gly
 1 5 10 15
 cga tcc gag acc gct ttg cgg aac ttc ctg cac ggc ctg ccg ggc gtg 96
 Arg Ser Glu Thr Ala Leu Arg Asn Phe Leu His Gly Leu Pro Gly Val
 20 25 30
 gac cag gtc ggc gcg gag cag cgg gcg gcc cag ctc ggc acc cgc tcg 144
 Asp Gln Val Gly Ala Glu Gln Arg Ala Ala Gln Leu Gly Thr Arg Ser
 35 40 45
 atc aag acc acg gcc aag gcc cgg gcg atc gac ctg gcg atc cgg atg 192
 Ile Lys Thr Thr Ala Lys Ala Arg Ala Ile Asp Leu Ala Ile Arg Met
 50 55 60
 gtc gac ctg acc acc ctg gag ggg gcc gac acc ccc ggc aag gtg cgg 240
 Val Asp Leu Thr Thr Leu Glu Gly Ala Asp Thr Pro Gly Lys Val Arg
 65 70 75 80
 gcg ctc gcg gcc aaa gca ctg cgc ccc gac ccg gcc gac ccg tcc tgc 288
 Ala Leu Ala Ala Lys Ala Leu Arg Pro Asp Pro Ala Asp Pro Ser Cys
 85 90 95
 ccg cac gtc ggc gca gtc tgc gtc tac ccg gcg atg gtc ccg tac gtg 336
 Pro His Val Gly Ala Val Cys Val Tyr Pro Ala Met Val Pro Tyr Val
 100 105 110
 gcc gag gtg ctg cgc gga tcc gcc ggg tcc ggg cgg ccg tcc ggc gga 384
 Ala Glu Val Leu Arg Gly Ser Ala Gly Ser Gly Arg Pro Ser Gly Gly
 115 120 125
 ccg gac ggc aac gcg ccg gcc gga ccc ggc gtg gtg cac ctg gcc agc 432
 Pro Asp Gly Asn Ala Pro Ala Gly Pro Gly Val Val His Leu Ala Ser
 130 135 140
 gtg gcc acc gcg ttt ccg tcc ggg cag gca ccc ctg gag gtc aag ctc 480
 Val Ala Thr Ala Phe Pro Ser Gly Gln Ala Pro Leu Glu Val Lys Leu
 145 150 155 160
 gcc gac acc cgg gcc gca gtg gcg gct ggc gcg gac gag atc gac atg 528
 Ala Asp Thr Arg Ala Ala Val Ala Ala Gly Ala Asp Glu Ile Asp Met
 165 170 175
 gtg atc aac cgg ggc gcg ttc ctg gcc ggc cgc tac cgc gag gtc tac 576
 Val Ile Asn Arg Gly Ala Phe Leu Ala Gly Arg Tyr Arg Glu Val Tyr
 180 185 190

gac gag atc gtg gcc acc aaa cag gcg tgc ggg gac gcc cac ctc aag	624
Asp Glu Ile Val Ala Thr Lys Gln Ala Cys Gly Asp Ala His Leu Lys	
195 200 205	
gtg atc ctg gaa acc ggc gag ctg gcc acg tac gac aac gtg cgc cgg	672
Val Ile Leu Glu Thr Gly Glu Leu Ala Thr Tyr Asp Asn Val Arg Arg	
210 215 220	
gcg tcc tgg ctg gcc atg ctg gcc ggc ggc gac ttc atc aag acc tcg	720
Ala Ser Trp Leu Ala Met Leu Ala Gly Gly Asp Phe Ile Lys Thr Ser	
225 230 235 240	
acg ggc aag gtt ccc gtc gcg gcg acc ctc ccg gtg acg ctg gtg atg	768
Thr Gly Lys Val Pro Val Ala Ala Thr Leu Pro Val Thr Leu Val Met	
245 250 255	
ctg gag gcg gtc cgc gac ttc cgc gcc gcc acc ggg cgg cag gtc ggc	816
Leu Glu Ala Val Arg Asp Phe Arg Ala Ala Thr Gly Arg Gln Val Gly	
260 265 270	
gtg aag ccg gcc ggc ggc atc aag aac acc aag gac gcg atc aag tac	864
Val Lys Pro Ala Gly Gly Ile Lys Asn Thr Lys Asp Ala Ile Lys Tyr	
275 280 285	
ctg gtt atg gtc aac gag acc gtc ggc ccg gac tgg ctg gac ccg gac	912
Leu Val Met Val Asn Glu Thr Val Gly Pro Asp Trp Leu Asp Pro Asp	
290 295 300	
tgg ttc cgg ttc ggc gcg tcc agc ctg ctc aac gac ctg ctc atg cag	960
Trp Phe Arg Phe Gly Ala Ser Ser Leu Leu Asn Asp Leu Leu Met Gln	
305 310 315 320	
cgc acc aag ctg acg acc ggc gtc tac tcc ggt ccc gac tac ttc acc	1008
Arg Thr Lys Leu Thr Thr Gly Val Tyr Ser Gly Pro Asp Tyr Phe Thr	
325 330 335	
ctg gac	1014
Leu Asp	
 <210> 135	
<211> 338	
<212> PRT	
<213> Micromonospora carbonacea	
 <220>	
<223> evbW	
 <400> 135	
Met Thr Ala Thr Ala Thr Ser Ala Arg Ser Asp Leu Ser Glu Leu Gly	
1 5 10 15	
Arg Ser Glu Thr Ala Leu Arg Asn Phe Leu His Gly Leu Pro Gly Val	
20 25 30	
Asp Gln Val Gly Ala Glu Gln Arg Ala Ala Gln Leu Gly Thr Arg Ser	
35 40 45	
Ile Lys Thr Thr Ala Lys Ala Arg Ala Ile Asp Leu Ala Ile Arg Met	
50 55 60	
Val Asp Leu Thr Thr Leu Glu Gly Ala Asp Thr Pro Gly Lys Val Arg	
65 70 75 80	

Ala Leu Ala Ala Lys Ala Leu Arg Pro Asp Pro Ala Asp Pro Ser Cys
 85 90 95
 Pro His Val Gly Ala Val Cys Val Tyr Pro Ala Met Val Pro Tyr Val
 100 105 110
 Ala Glu Val Leu Arg Gly Ser Ala Gly Ser Gly Arg Pro Ser Gly Gly
 115 120 125
 Pro Asp Gly Asn Ala Pro Ala Gly Pro Gly Val Val His Leu Ala Ser
 130 135 140
 Val Ala Thr Ala Phe Pro Ser Gly Gln Ala Pro Leu Glu Val Lys Leu
 145 150 155 160
 Ala Asp Thr Arg Ala Ala Val Ala Ala Gly Ala Asp Glu Ile Asp Met
 165 170 175
 Val Ile Asn Arg Gly Ala Phe Leu Ala Gly Arg Tyr Arg Glu Val Tyr
 180 185 190
 Asp Glu Ile Val Ala Thr Lys Gln Ala Cys Gly Asp Ala His Leu Lys
 195 200 205
 Val Ile Leu Glu Thr Gly Glu Leu Ala Thr Tyr Asp Asn Val Arg Arg
 210 215 220
 Ala Ser Trp Leu Ala Met Leu Ala Gly Gly Asp Phe Ile Lys Thr Ser
 225 230 235 240
 Thr Gly Lys Val Pro Val Ala Ala Thr Leu Pro Val Thr Leu Val Met
 245 250 255
 Leu Glu Ala Val Arg Asp Phe Arg Ala Ala Thr Gly Arg Gln Val Gly
 260 265 270
 Val Lys Pro Ala Gly Gly Ile Lys Asn Thr Lys Asp Ala Ile Lys Tyr
 275 280 285
 Leu Val Met Val Asn Glu Thr Val Gly Pro Asp Trp Leu Asp Pro Asp
 290 295 300
 Trp Phe Arg Phe Gly Ala Ser Ser Leu Leu Asn Asp Leu Leu Met Gln
 305 310 315 320
 Arg Thr Lys Leu Thr Thr Gly Val Tyr Ser Gly Pro Asp Tyr Phe Thr
 325 330 335
 Leu Asp

<210> 136
 <211> 1431
 <212> DNA
 <213> Micromonospora carbonacea

<220>
 <221> CDS
 <222> (1)..(1431)

<220>
 <223> evbX

<400> 136																
gtg	atc	ttc	gaa	tac	gcg	ccc	gcc	ccc	gag	tcc	cgc	tcg	gtg	gtg	gac	48
Val	Ile	Phe	Glu	Tyr	Ala	Pro	Ala	Pro	Glu	Ser	Arg	Ser	Val	Val	Asp	
1				5					10					15		
ctc	aag	ccc	tcg	tac	ggg	ctg	ttc	gtc	gac	ggg	gag	ttc	gtc	gac	ccg	96
Leu	Lys	Pro	Ser	Tyr	Gly	Leu	Phe	Val	Asp	Gly	Glu	Phe	Val	Asp	Pro	
			20					25					30			
gcc	gac	ggc	ggc	ggc	ttc	aag	tcg	gtc	aac	ccc	gcc	tcc	gag	gag	gtg	144
Ala	Asp	Gly	Gly	Gly	Phe	Lys	Ser	Val	Asn	Pro	Ala	Ser	Glu	Glu	Val	
		35					40					45				
ctc	gcc	gag	atc	gcc	gag	gcg	ggc	agc	gcc	gac	gtg	gac	cgg	gcg	gtc	192
Leu	Ala	Glu	Ile	Ala	Glu	Ala	Gly	Ser	Ala	Asp	Val	Asp	Arg	Ala	Val	
	50					55					60					
cgc	gcc	gcc	cgg	acg	gcg	tac	gag	aag	gtg	tgg	ggc	ccg	atg	ccg	ggc	240
Arg	Ala	Ala	Arg	Thr	Ala	Tyr	Glu	Lys	Val	Trp	Gly	Pro	Met	Pro	Gly	
65					70					75					80	
cgg	gac	cgg	gcc	aag	tac	ctg	ttc	cgg	atc	gcc	cgg	atc	atc	cag	gag	288
Arg	Asp	Arg	Ala	Lys	Tyr	Leu	Phe	Arg	Ile	Ala	Arg	Ile	Ile	Gln	Glu	
				85					90					95		
cgc	tcc	cgc	gag	ctg	gcc	gtg	ctg	gag	tcc	ctg	gac	aac	ggc	aaa	ccg	336
Arg	Ser	Arg	Glu	Leu	Ala	Val	Leu	Glu	Ser	Leu	Asp	Asn	Gly	Lys	Pro	
			100				105						110			
atc	cgg	gag	tcc	cgg	gac	gtc	gac	ctg	ccg	ctg	gtc	gcc	gcg	cac	ttc	384
Ile	Arg	Glu	Ser	Arg	Asp	Val	Asp	Leu	Pro	Leu	Val	Ala	Ala	His	Phe	
		115					120					125				
ttc	tac	tac	gcg	ggc	tgg	gca	gac	aag	ctg	ccg	tac	gcg	ggc	ttc	ggc	432
Phe	Tyr	Tyr	Ala	Gly	Trp	Ala	Asp	Lys	Leu	Pro	Tyr	Ala	Gly	Phe	Gly	
	130					135					140					
ccg	aac	ccc	cgg	ccg	ctc	ggc	gtg	gcc	gcg	cag	gtc	atc	ccg	tgg	aac	480
Pro	Asn	Pro	Arg	Pro	Leu	Gly	Val	Ala	Ala	Gln	Val	Ile	Pro	Trp	Asn	
145					150					155					160	
ttc	ccg	ctg	ctc	atg	ctc	gcc	tgg	aag	atc	gcc	ccg	gcg	ctg	gcc	gcc	528
Phe	Pro	Leu	Leu	Met	Leu	Ala	Trp	Lys	Ile	Ala	Pro	Ala	Leu	Ala	Ala	
				165					170					175		
ggc	aac	acg	gtg	gtg	ctc	aag	ccg	gcg	gag	acc	acc	ccg	ctg	acc	gcg	576
Gly	Asn	Thr	Val	Val	Leu	Lys	Pro	Ala	Glu	Thr	Thr	Pro	Leu	Thr	Ala	
			180					185					190			
ctg	ctg	ttc	gcc	gag	atc	tgc	cag	cag	gcc	gag	ctg	ccg	gcc	ggc	gtg	624
Leu	Leu	Phe	Ala	Glu	Ile	Cys	Gln	Gln	Ala	Glu	Leu	Pro	Ala	Gly	Val	
		195				200						205				
gtc	aac	atc	gtc	acc	ggc	gcg	ggc	gac	acc	ggc	cgg	gcg	ctg	gtc	gag	672
Val	Asn	Ile	Val	Thr	Gly	Ala	Gly	Asp	Thr	Gly	Arg	Ala	Leu	Val	Glu	
	210					215					220					
cac	ccg	ggc	gtg	gac	aag	gtc	gcg	ttc	acc	ggc	tcg	acc	gag	gtc	ggc	720
His	Pro	Gly	Val	Asp	Lys	Val	Ala	Phe	Thr	Gly	Ser	Thr	Glu	Val	Gly	
225					230					235					240	
aag	gcc	atc	gcc	cgg	tcc	gtc	gcg	ggc	acc	ggc	aag	aag	gtc	acc	ctg	768
Lys	Ala	Ile	Ala	Arg	Ser	Val	Ala	Gly	Thr	Gly	Lys	Lys	Val	Thr	Leu	
				245				250						255		

gag	ctg	ggc	ggc	aag	gcc	gcg	aac	atc	gtc	ttc	gac	gac	gcc	ccg	gtc	816
Glu	Leu	Gly	Gly	Lys	Ala	Ala	Asn	Ile	Val	Phe	Asp	Asp	Ala	Pro	Val	
		260						265					270			
gac	cag	gcg	gtc	gag	ggg	atc	gtc	aac	ggc	atc	ttc	ttc	aac	cag	ggg	864
Asp	Gln	Ala	Val	Glu	Gly	Ile	Val	Asn	Gly	Ile	Phe	Phe	Asn	Gln	Gly	
	275						280					285				
cac	gtc	tgc	tgc	gcc	ggg	tcg	cgg	ctg	ctg	gtc	cag	gag	tcg	gtc	gcc	912
His	Val	Cys	Cys	Ala	Gly	Ser	Arg	Leu	Leu	Val	Gln	Glu	Ser	Val	Ala	
	290					295					300					
gag	cag	gtg	ctg	gag	tcg	ctg	aag	cgc	cga	atg	gcg	ctg	ctg	cgg	gtc	960
Glu	Gln	Val	Leu	Glu	Ser	Leu	Lys	Arg	Arg	Met	Ala	Leu	Leu	Arg	Val	
305					310					315					320	
ggc	gac	ccg	ttg	gac	aag	aac	acc	gac	atc	ggg	gcg	atc	aac	tcg	gcc	1008
Gly	Asp	Pro	Leu	Asp	Lys	Asn	Thr	Asp	Ile	Gly	Ala	Ile	Asn	Ser	Ala	
				325					330					335		
gcc	cag	ctc	gcc	cgc	atc	cgc	gag	ctg	tcc	gcc	gcg	ggc	gag	gcc	gag	1056
Ala	Gln	Leu	Ala	Arg	Ile	Arg	Glu	Leu	Ser	Ala	Ala	Gly	Glu	Ala	Glu	
		340						345					350			
ggg	gcg	gag	cgc	tgg	tcg	ccg	ccg	tgc	gag	ctg	ccc	gag	cgc	ggg	ttc	1104
Gly	Ala	Glu	Arg	Trp	Ser	Pro	Pro	Cys	Glu	Leu	Pro	Glu	Arg	Gly	Phe	
	355						360					365				
tgg	ttc	gcg	ccg	acg	atc	ttc	acg	ggg	gtc	acc	cag	gcg	cac	cgg	atc	1152
Trp	Phe	Ala	Pro	Thr	Ile	Phe	Thr	Gly	Val	Thr	Gln	Ala	His	Arg	Ile	
	370					375					380					
gcc	cgg	gag	gag	atc	ttc	ggg	ccg	gtg	ctg	tcc	gtg	ctg	acc	ttc	cgc	1200
Ala	Arg	Glu	Glu	Ile	Phe	Gly	Pro	Val	Leu	Ser	Val	Leu	Thr	Phe	Arg	
385				390						395					400	
acc	ccg	gcc	gag	gcc	gtc	gag	aag	gcc	aac	aac	acg	ccg	tac	ggg	ctg	1248
Thr	Pro	Ala	Glu	Ala	Val	Glu	Lys	Ala	Asn	Asn	Thr	Pro	Tyr	Gly	Leu	
				405					410					415		
tcg	gcc	ggg	atc	tgg	acc	gac	aag	ggc	tcc	cgg	atc	ctg	tgg	atg	gcc	1296
Ser	Ala	Gly	Ile	Trp	Thr	Asp	Lys	Gly	Ser	Arg	Ile	Leu	Trp	Met	Ala	
		420						425					430			
gac	cgg	ctg	cgc	gcc	ggg	gtg	gtg	tgg	gcc	aac	acg	ttc	aac	aag	ttc	1344
Asp	Arg	Leu	Arg	Ala	Gly	Val	Val	Trp	Ala	Asn	Thr	Phe	Asn	Lys	Phe	
	435					440						445				
gac	ccg	acc	tcg	ccg	ttc	ggc	ggg	tac	aag	gag	tcg	ggc	tac	ggg	cgc	1392
Asp	Pro	Thr	Ser	Pro	Phe	Gly	Gly	Tyr	Lys	Glu	Ser	Gly	Tyr	Gly	Arg	
	450					455					460					
gag	ggc	ggc	cgg	cac	ggg	ctg	gag	ggg	tac	ctc	ggg	gtc				1431
Glu	Gly	Gly	Arg	His	Gly	Leu	Glu	Gly	Tyr	Leu	Gly	Val				
465					470					475						

<210> 137

<211> 477

<212> PRT

<213> Micromonospora carbonacea

<220>

<223> evbX

<400> 137

Val	Ile	Phe	Glu	Tyr	Ala	Pro	Ala	Pro	Glu	Ser	Arg	Ser	Val	Val	Asp
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Leu	Lys	Pro	Ser	Tyr	Gly	Leu	Phe	Val	Asp	Gly	Glu	Phe	Val	Asp	Pro
			20					25					30		
Ala	Asp	Gly	Gly	Gly	Phe	Lys	Ser	Val	Asn	Pro	Ala	Ser	Glu	Glu	Val
		35					40					45			
Leu	Ala	Glu	Ile	Ala	Glu	Ala	Gly	Ser	Ala	Asp	Val	Asp	Arg	Ala	Val
	50					55					60				
Arg	Ala	Ala	Arg	Thr	Ala	Tyr	Glu	Lys	Val	Trp	Gly	Pro	Met	Pro	Gly
65					70					75					80
Arg	Asp	Arg	Ala	Lys	Tyr	Leu	Phe	Arg	Ile	Ala	Arg	Ile	Ile	Gln	Glu
				85					90					95	
Arg	Ser	Arg	Glu	Leu	Ala	Val	Leu	Glu	Ser	Leu	Asp	Asn	Gly	Lys	Pro
			100					105					110		
Ile	Arg	Glu	Ser	Arg	Asp	Val	Asp	Leu	Pro	Leu	Val	Ala	Ala	His	Phe
		115					120					125			
Phe	Tyr	Tyr	Ala	Gly	Trp	Ala	Asp	Lys	Leu	Pro	Tyr	Ala	Gly	Phe	Gly
	130					135					140				
Pro	Asn	Pro	Arg	Pro	Leu	Gly	Val	Ala	Ala	Gln	Val	Ile	Pro	Trp	Asn
145					150					155					160
Phe	Pro	Leu	Leu	Met	Leu	Ala	Trp	Lys	Ile	Ala	Pro	Ala	Leu	Ala	Ala
				165					170					175	
Gly	Asn	Thr	Val	Val	Leu	Lys	Pro	Ala	Glu	Thr	Thr	Pro	Leu	Thr	Ala
			180					185					190		
Leu	Leu	Phe	Ala	Glu	Ile	Cys	Gln	Gln	Ala	Glu	Leu	Pro	Ala	Gly	Val
		195					200					205			
Val	Asn	Ile	Val	Thr	Gly	Ala	Gly	Asp	Thr	Gly	Arg	Ala	Leu	Val	Glu
	210					215					220				
His	Pro	Gly	Val	Asp	Lys	Val	Ala	Phe	Thr	Gly	Ser	Thr	Glu	Val	Gly
225					230					235					240
Lys	Ala	Ile	Ala	Arg	Ser	Val	Ala	Gly	Thr	Gly	Lys	Lys	Val	Thr	Leu
				245					250					255	
Glu	Leu	Gly	Gly	Lys	Ala	Ala	Asn	Ile	Val	Phe	Asp	Asp	Ala	Pro	Val
			260					265					270		
Asp	Gln	Ala	Val	Glu	Gly	Ile	Val	Asn	Gly	Ile	Phe	Phe	Asn	Gln	Gly
		275					280					285			
His	Val	Cys	Cys	Ala	Gly	Ser	Arg	Leu	Leu	Val	Gln	Glu	Ser	Val	Ala
	290					295					300				
Glu	Gln	Val	Leu	Glu	Ser	Leu	Lys	Arg	Arg	Met	Ala	Leu	Leu	Arg	Val
305					310					315					320
Gly	Asp	Pro	Leu	Asp	Lys	Asn	Thr	Asp	Ile	Gly	Ala	Ile	Asn	Ser	Ala
				325					330				335		
Ala	Gln	Leu	Ala	Arg	Ile	Arg	Glu	Leu	Ser	Ala	Ala	Gly	Glu	Ala	Glu

340					345					350					
Gly	Ala	Glu	Arg	Trp	Ser	Pro	Pro	Cys	Glu	Leu	Pro	Glu	Arg	Gly	Phe
	355						360					365			
Trp	Phe	Ala	Pro	Thr	Ile	Phe	Thr	Gly	Val	Thr	Gln	Ala	His	Arg	Ile
	370					375					380				
Ala	Arg	Glu	Glu	Ile	Phe	Gly	Pro	Val	Leu	Ser	Val	Leu	Thr	Phe	Arg
385					390					395					400
Thr	Pro	Ala	Glu	Ala	Val	Glu	Lys	Ala	Asn	Asn	Thr	Pro	Tyr	Gly	Leu
				405					410					415	
Ser	Ala	Gly	Ile	Trp	Thr	Asp	Lys	Gly	Ser	Arg	Ile	Leu	Trp	Met	Ala
			420					425					430		
Asp	Arg	Leu	Arg	Ala	Gly	Val	Val	Trp	Ala	Asn	Thr	Phe	Asn	Lys	Phe
		435					440					445			
Asp	Pro	Thr	Ser	Pro	Phe	Gly	Gly	Tyr	Lys	Glu	Ser	Gly	Tyr	Gly	Arg
	450					455					460				
Glu	Gly	Gly	Arg	His	Gly	Leu	Glu	Gly	Tyr	Leu	Gly	Val			
465					470					475					

<210> 138

<211> 735

<212> DNA

<213> Micromonospora carbonacea

<220>

<221> CDS

<222> (1)..(735)

<220>

<223> evbY

<400> 138

gtg	caa	tcc	gcg	aac	gtg	tcg	ctg	gcc	tcc	cgc	aag	gac	gcg	cgg	gac	48
Val	Gln	Ser	Ala	Asn	Val	Ser	Leu	Ala	Ser	Arg	Lys	Asp	Ala	Arg	Asp	
1				5					10					15		
gcc	gtg	gtc	gcc	gcc	cgc	gcc	gcc	gtg	aag	ggc	tgg	gcc	ggg	gcg	acc	96
Ala	Val	Val	Ala	Ala	Arg	Ala	Ala	Val	Lys	Gly	Trp	Ala	Gly	Ala	Thr	
			20					25					30			
gcg	tac	aac	cgg	ggt	cag	atc	ctc	tac	cgg	gtc	gcc	gag	atg	ctg	gag	144
Ala	Tyr	Asn	Arg	Gly	Gln	Ile	Leu	Tyr	Arg	Val	Ala	Glu	Met	Leu	Glu	
		35				40					45					
ggc	cgc	cgc	gag	cag	ttc	gtc	gcg	ctc	ggc	gtg	ccg	gcc	gac	gag	gtc	192
Gly	Arg	Arg	Glu	Gln	Phe	Val	Ala	Leu	Gly	Val	Pro	Ala	Asp	Glu	Val	
	50				55						60					
gac	gcg	gcg	atc	gac	cgc	tgg	gtc	tgg	tac	gcg	ggc	tgg	tcc	gac	aag	240
Asp	Ala	Ala	Ile	Asp	Arg	Trp	Val	Trp	Tyr	Ala	Gly	Trp	Ser	Asp	Lys	
	65				70					75					80	
ctc	ccc	cag	gtg	tac	ggc	ggt	gcg	aac	cct	gtc	gcc	ggg	ccg	tac	ttc	288
Leu	Pro	Gln	Val	Tyr	Gly	Gly	Ala	Asn	Pro	Val	Ala	Gly	Pro	Tyr	Phe	
				85					90					95		


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aac ctg tcc gcg ccc gag ccg acg ggg gtg gtg gcc gtg gtg gcc ccc 336
Asn Leu Ser Ala Pro Glu Pro Thr Gly Val Val Ala Val Val Ala Pro
      100                      105                      110

gag gcc ccc gcg ctg ctc ggc ctg gtc agc gtg atc gcc ccg gcg atc 384
Glu Ala Pro Ala Leu Leu Gly Leu Val Ser Val Ile Ala Pro Ala Ile
      115                      120                      125

gtc acc ggc aac acg gtg gtg gtg gcg gcc tcg ccg acc cag ccc ctg 432
Val Thr Gly Asn Thr Val Val Val Ala Ala Ser Pro Thr Gln Pro Leu
      130                      135                      140

gcc tcg gtg acc ctg gcc gag gtg ctg gcc acc tcc gac ctg ccc ggc 480
Ala Ser Val Thr Leu Ala Glu Val Leu Ala Thr Ser Asp Leu Pro Gly
      145                      150                      155                      160

ggg gtg gtc aac gtc ctg acc ggt gcg atc acc gag acg gtg ccg acg 528
Gly Val Val Asn Val Leu Thr Gly Ala Ile Thr Glu Thr Val Pro Thr
      165                      170                      175

ctc gcg gcg cac ctg gac gtc aac gcg atc gac ctg acc ggg gtg ggc 576
Leu Ala Ala His Leu Asp Val Asn Ala Ile Asp Leu Thr Gly Val Gly
      180                      185                      190

gac gcg tcg ctc gcc acc gag ctg gag gtc agg gcg gcg gag aac ctc 624
Asp Ala Ser Leu Ala Thr Glu Leu Glu Val Arg Ala Ala Glu Asn Leu
      195                      200                      205

aag cgg gtg att cgg ccg gcc ccg gcc gac cac gac tgg tac gcc gac 672
Lys Arg Val Ile Arg Pro Ala Pro Ala Asp His Asp Trp Tyr Ala Asp
      210                      215                      220

ccg ggc ctc acc cgg atg acg acg ctg ctg gag acg aag acg gtc tgg 720
Pro Gly Leu Thr Arg Met Thr Thr Leu Leu Glu Thr Lys Thr Val Trp
      225                      230                      235                      240

cac ccc aag ggc gtc
His Pro Lys Gly Val
      245

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<210> 139

<211> 245

<212> PRT

<213> Micromonospora carbonacea

<220>

<223> evbY

<400> 139

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Val Gln Ser Ala Asn Val Ser Leu Ala Ser Arg Lys Asp Ala Arg Asp
  1                      5                      10                      15

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Ala Val Val Ala Ala Arg Ala Ala Val Lys Gly Trp Ala Gly Ala Thr
      20                      25                      30

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Ala Tyr Asn Arg Gly Gln Ile Leu Tyr Arg Val Ala Glu Met Leu Glu
      35                      40                      45

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Gly Arg Arg Glu Gln Phe Val Ala Leu Gly Val Pro Ala Asp Glu Val
      50                      55                      60

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Asp Ala Ala Ile Asp Arg Trp Val Trp Tyr Ala Gly Trp Ser Asp Lys
      65                      70                      75                      80

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Leu Pro Gln Val Tyr Gly Gly Ala Asn Pro Val Ala Gly Pro Tyr Phe
 85 90 95
 Asn Leu Ser Ala Pro Glu Pro Thr Gly Val Val Ala Val Val Ala Pro
 100 105 110
 Glu Ala Pro Ala Leu Leu Gly Leu Val Ser Val Ile Ala Pro Ala Ile
 115 120 125
 Val Thr Gly Asn Thr Val Val Val Ala Ala Ser Pro Thr Gln Pro Leu
 130 135 140
 Ala Ser Val Thr Leu Ala Glu Val Leu Ala Thr Ser Asp Leu Pro Gly
 145 150 155 160
 Gly Val Val Asn Val Leu Thr Gly Ala Ile Thr Glu Thr Val Pro Thr
 165 170 175
 Leu Ala Ala His Leu Asp Val Asn Ala Ile Asp Leu Thr Gly Val Gly
 180 185 190
 Asp Ala Ser Leu Ala Thr Glu Leu Glu Val Arg Ala Ala Glu Asn Leu
 195 200 205
 Lys Arg Val Ile Arg Pro Ala Pro Ala Asp His Asp Trp Tyr Ala Asp
 210 215 220
 Pro Gly Leu Thr Arg Met Thr Thr Leu Leu Glu Thr Lys Thr Val Trp
 225 230 235 240
 His Pro Lys Gly Val
 245

<210> 140
 <211> 411
 <212> DNA
 <213> Micromonospora carbonacea

<220>
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 <222> (1)..(411)

<220>
 <223> evbZ

<400> 140
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 Met Asp Val Leu Trp Asp Thr Val Pro Gly Thr Ser Asp Gly Val Thr
 1 5 10 15
 gtg cgc gag gtc gcc gag gcc ctc gac ggc cgc gag ctg gcg tac acg 96
 Val Arg Glu Val Ala Glu Ala Leu Asp Gly Arg Glu Leu Ala Tyr Thr
 20 25 30
 acg gtg atg acc gtg ctg gac cgg ctc gcc ggc aag ggc atg gtg cgg 144
 Thr Val Met Thr Val Leu Asp Arg Leu Ala Gly Lys Gly Met Val Arg
 35 40 45
 cgc cag cgg gag ggg cgg gcc tgg cgc tac cag gcc gcg gcc agc cgc 192
 Arg Gln Arg Glu Gly Arg Ala Trp Arg Tyr Gln Ala Ala Ala Ser Arg
 50 55 60
 gag gcg cac atc gcc cag ctc atg ctc gac gcg ctg gac ctc ggc ggc 240

Glu	Ala	His	Ile	Ala	Gln	Leu	Met	Leu	Asp	Ala	Leu	Asp	Leu	Gly	Gly		
65					70					75					80		
agc	cgg	gac	gcc	gcg	ctg	gtg	cgc	ttc	gcc	cgg	tcg	gtg	acc	ggc	acc	288	
Ser	Arg	Asp	Ala	Ala	Leu	Val	Arg	Phe	Ala	Arg	Ser	Val	Thr	Gly	Thr		
			85						90					95			
gag	gcc	gag	gtg	ctg	cgc	gcc	gcc	ctc	ggc	gcc	gag	gcg	ggc	ggc	ccg	336	
Glu	Ala	Glu	Val	Leu	Arg	Ala	Ala	Leu	Gly	Ala	Glu	Ala	Gly	Gly	Pro		
			100					105					110				
ctg	acc	gac	cgc	gtc	gac	gcg	ccg	cgc	gcc	gac	cgg	gcc	ggg	cag	ccg	384	
Leu	Thr	Asp	Arg	Val	Asp	Ala	Pro	Arg	Ala	Asp	Arg	Ala	Gly	Gln	Pro		
		115					120					125					
gcc	ctg	gcc	gac	gag	gcg	acg	gac	cgg								411	
Ala	Leu	Ala	Asp	Glu	Ala	Thr	Asp	Arg									
	130						135										

<210> 141
 <211> 137
 <212> PRT
 <213> Micromonospora carbonacea

<220>
 <223> evbZ

Met	Asp	Val	Leu	Trp	Asp	Thr	Val	Pro	Gly	Thr	Ser	Asp	Gly	Val	Thr		
1				5					10					15			
Val	Arg	Glu	Val	Ala	Glu	Ala	Leu	Asp	Gly	Arg	Glu	Leu	Ala	Tyr	Thr		
			20					25					30				
Thr	Val	Met	Thr	Val	Leu	Asp	Arg	Leu	Ala	Gly	Lys	Gly	Met	Val	Arg		
		35					40					45					
Arg	Gln	Arg	Glu	Gly	Arg	Ala	Trp	Arg	Tyr	Gln	Ala	Ala	Ala	Ser	Arg		
	50					55					60						
Glu	Ala	His	Ile	Ala	Gln	Leu	Met	Leu	Asp	Ala	Leu	Asp	Leu	Gly	Gly		
65					70					75				80			
Ser	Arg	Asp	Ala	Ala	Leu	Val	Arg	Phe	Ala	Arg	Ser	Val	Thr	Gly	Thr		
			85						90					95			
Glu	Ala	Glu	Val	Leu	Arg	Ala	Ala	Leu	Gly	Ala	Glu	Ala	Gly	Gly	Pro		
			100					105					110				
Leu	Thr	Asp	Arg	Val	Asp	Ala	Pro	Arg	Ala	Asp	Arg	Ala	Gly	Gln	Pro		
		115					120					125					
Ala	Leu	Ala	Asp	Glu	Ala	Thr	Asp	Arg									
	130						135										

<210> 142
 <211> 903
 <212> DNA
 <213> Micromonospora carbonacea

<220>
 <221> CDS

<222> (1) .. (903)

<220>

<223> evcA

<400> 142

atg gcg tac gcc gtg cac ttc gcc gcg acg gtc ctg gcc tgc tac ctg	48
Met Ala Tyr Ala Val His Phe Ala Ala Thr Val Leu Ala Cys Tyr Leu	
1 5 10 15	
acc gct cag gtc ctg gcg gcg tcc acc tgg acg tgg cgg gcc ccc cgg	96
Thr Ala Gln Val Leu Ala Ala Ser Thr Trp Thr Trp Arg Ala Pro Arg	
20 25 30	
atc gcg atc gtc tgc tgg cag gcg gtc ggg ctc gcg ctc ggg ctc tcc	144
Ile Ala Ile Val Cys Trp Gln Ala Val Gly Leu Ala Leu Gly Leu Ser	
35 40 45	
gcg atg ggc ctg ccg atg gcg ctc ggc gtg gcc gcg tac gac cgg ccg	192
Ala Met Gly Leu Pro Met Ala Leu Gly Val Ala Ala Tyr Asp Arg Pro	
50 55 60	
acc ggc agc gcg ttg ctc gcc ctg gcc acc gac ctg acc cac ggc acc	240
Thr Gly Ser Ala Leu Leu Ala Leu Ala Thr Asp Leu Thr His Gly Thr	
65 70 75 80	
ctg ccg gcc ggg ctc ggc gcg gtc cac ctc ggt ctg gtc ggg gtc ggg	288
Leu Pro Ala Gly Leu Gly Ala Val His Leu Gly Leu Val Gly Val Gly	
85 90 95	
ttc ggc atc ggg gcg gcg ctg ctc gcc acg acg gta cgc agc gtg cag	336
Phe Gly Ile Gly Ala Ala Leu Leu Ala Thr Thr Val Arg Ser Val Gln	
100 105 110	
gcg acc gtc cgg gcc cag cgg cag cac cgg gac ctg ctc gcc ctg gtg	384
Ala Thr Val Arg Ala Gln Arg Gln His Arg Asp Leu Leu Ala Leu Val	
115 120 125	
gcc cgg cgg gac ccg gag gtg ccg ggg gcg ctg gtg ctg gac cat ccg	432
Ala Arg Arg Asp Pro Glu Val Pro Gly Ala Leu Val Leu Asp His Pro	
130 135 140	
agc gcg gcg gcg tac tgc ctg ccg ggc gtg cgg ccc cgg gtg gtg gtc	480
Ser Ala Ala Ala Tyr Cys Leu Pro Gly Val Arg Pro Arg Val Val Val	
145 150 155 160	
agc gcc ggg gcg ctc agc atg ctc gac cgg gcc gag ctg gcg gcg gtg	528
Ser Ala Gly Ala Leu Ser Met Leu Asp Arg Ala Glu Leu Ala Ala Val	
165 170 175	
ctg acc cac gag cgg gcg cac gcc cag gag cgc cac gac ctt gtg ctg	576
Leu Thr His Glu Arg Ala His Ala Gln Glu Arg His Asp Leu Val Leu	
180 185 190	
ctg ccg ttc acc gcg ctg tgc cgt gcg ctg ccc tgg ttc cgt tgg gta	624
Leu Pro Phe Thr Ala Leu Cys Arg Ala Leu Pro Trp Phe Arg Trp Val	
195 200 205	
cgc gac gcg cac gag cgg gtc gcc ctg ctg gtc gag atg cgc gcc gac	672
Arg Asp Ala His Glu Arg Val Ala Leu Leu Val Glu Met Arg Ala Asp	
210 215 220	
gac aag gcc cgg gag ctg cac gcc gag gct ccc ctc gcg ggg gcg ttg	720
Asp Lys Ala Arg Glu Leu His Ala Glu Ala Pro Leu Ala Gly Ala Leu	
225 230 235 240	

cgc cgg ttc gcc gcg gcc ggc cac cgg atc gcg ccg gcc ggc acc ctc 768
 Arg Arg Phe Ala Ala Ala Gly His Arg Ile Ala Pro Ala Gly Thr Leu
 245 250 255

ggc ctg ggc gac cgg gac ctg gac gtc cgg gtc cag cgg ctg ctg gtc 816
 Gly Leu Gly Asp Arg Asp Leu Asp Val Arg Val Gln Arg Leu Leu Val
 260 265 270

gcc gac cgg ccg ccc cgg ctg atc ggg gcc gcc gcg ctg gcg gtg gcg 864
 Ala Asp Arg Pro Pro Arg Leu Ile Gly Ala Ala Ala Leu Ala Val Ala
 275 280 285

gtc acc ctg gtc gcg ctg ccg gtc tcc ctc ttc ctg agc 903
 Val Thr Leu Val Ala Leu Pro Val Ser Leu Phe Leu Ser
 290 295 300

<210> 143

<211> 301

<212> PRT

<213> Micromonospora carbonacea

<220>

<223> evcA

<400> 143

Met Ala Tyr Ala Val His Phe Ala Ala Thr Val Leu Ala Cys Tyr Leu
 1 5 10 15

Thr Ala Gln Val Leu Ala Ala Ser Thr Trp Thr Trp Arg Ala Pro Arg
 20 25 30

Ile Ala Ile Val Cys Trp Gln Ala Val Gly Leu Ala Leu Gly Leu Ser
 35 40 45

Ala Met Gly Leu Pro Met Ala Leu Gly Val Ala Ala Tyr Asp Arg Pro
 50 55 60

Thr Gly Ser Ala Leu Leu Ala Leu Ala Thr Asp Leu Thr His Gly Thr
 65 70 75 80

Leu Pro Ala Gly Leu Gly Ala Val His Leu Gly Leu Val Gly Val Gly
 85 90 95

Phe Gly Ile Gly Ala Ala Leu Leu Ala Thr Thr Val Arg Ser Val Gln
 100 105 110

Ala Thr Val Arg Ala Gln Arg Gln His Arg Asp Leu Leu Ala Leu Val
 115 120 125

Ala Arg Arg Asp Pro Glu Val Pro Gly Ala Leu Val Leu Asp His Pro
 130 135 140

Ser Ala Ala Ala Tyr Cys Leu Pro Gly Val Arg Pro Arg Val Val Val
 145 150 155 160

Ser Ala Gly Ala Leu Ser Met Leu Asp Arg Ala Glu Leu Ala Ala Val
 165 170 175

Leu Thr His Glu Arg Ala His Ala Gln Glu Arg His Asp Leu Val Leu
 180 185 190

Leu Pro Phe Thr Ala Leu Cys Arg Ala Leu Pro Trp Phe Arg Trp Val
 195 200 205

Arg Asp Ala His Glu Arg Val Ala Leu Leu Val Glu Met Arg Ala Asp
 210 215 220
 Asp Lys Ala Arg Glu Leu His Ala Glu Ala Pro Leu Ala Gly Ala Leu
 225 230 235 240
 Arg Arg Phe Ala Ala Ala Gly His Arg Ile Ala Pro Ala Gly Thr Leu
 245 250 255
 Gly Leu Gly Asp Arg Asp Leu Asp Val Arg Val Gln Arg Leu Leu Val
 260 265 270
 Ala Asp Arg Pro Pro Arg Leu Ile Gly Ala Ala Ala Leu Ala Val Ala
 275 280 285
 Val Thr Leu Val Ala Leu Pro Val Ser Leu Phe Leu Ser
 290 295 300

<210> 144
 <211> 1248
 <212> DNA
 <213> Micromonospora carbonacea

<220>
 <221> CDS
 <222> (1)..(1248)

<220>
 <223> evcB

<400> 144
 atg gat caa ctg ctc ctc gcc cgt ctc cag ttc gcc acg acc acc tcg 48
 Met Asp Gln Leu Leu Leu Ala Arg Leu Gln Phe Ala Thr Thr Thr Ser
 1 5 10 15
 ctg cac ttc ctc ttc gtc gtc gtc acg ctc ggt ctg gtc acc ctg ctc 96
 Leu His Phe Leu Phe Val Val Val Thr Leu Gly Leu Val Thr Leu Leu
 20 25 30
 gtc ggg ctc cag acg gcc tgg acg atc acc ggc aat ccc gtc cac gag 144
 Val Gly Leu Gln Thr Ala Trp Thr Ile Thr Gly Asn Pro Val His Glu
 35 40 45
 cgg ctg acc cgg ttc tgg ggt cag ctc tac gtg atc aac tac gtg ctc 192
 Arg Leu Thr Arg Phe Trp Gly Gln Leu Tyr Val Ile Asn Tyr Val Leu
 50 55 60
 ggc atc gcc acc ggc ctg ctc atg gag ttc cag ttc ggg ctg aac tgg 240
 Gly Ile Ala Thr Gly Leu Leu Met Glu Phe Gln Phe Gly Leu Asn Trp
 65 70 75 80
 agc ggc ctg tcg cgc tac gtc ggc aac gtc ttc ggc gcc ccg ctg gcg 288
 Ser Gly Leu Ser Arg Tyr Val Gly Asn Val Phe Gly Ala Pro Leu Ala
 85 90 95
 atc gag acc ctg gtc gcg ttc ttc ctg gag tcc acg ttc ctc ggg atg 336
 Ile Glu Thr Leu Val Ala Phe Phe Leu Glu Ser Thr Phe Leu Gly Met
 100 105 110
 tgg atc ttc ggc tgg cac cgg ctg cgc cgg ggc gtg cac ctc gcg ctg 384
 Trp Ile Phe Gly Trp His Arg Leu Arg Arg Gly Val His Leu Ala Leu
 115 120 125

ctg	tgg	ggc	gtg	gcg	ctg	acc	gcg	tac	gcc	tcg	gcg	ttc	tgg	gtc	atg	432
Leu	Trp	Gly	Val	Ala	Leu	Thr	Ala	Tyr	Ala	Ser	Ala	Phe	Trp	Val	Met	
	130					135					140					
gtg	gcg	aac	gcc	tgg	ctg	cag	aac	ccg	gtc	ggc	tac	gag	gtg	cgc	gac	480
Val	Ala	Asn	Ala	Trp	Leu	Gln	Asn	Pro	Val	Gly	Tyr	Glu	Val	Arg	Asp	
	145				150					155					160	
ggg	gtg	gcc	cac	ctg	acc	gac	ttc	ggc	gcg	ttg	ctg	acc	aat	ccc	acc	528
Gly	Val	Ala	His	Leu	Thr	Asp	Phe	Gly	Ala	Leu	Leu	Thr	Asn	Pro	Thr	
				165					170					175		
ttc	ggc	ctg	gcc	ttc	ggg	cac	gtg	gtc	gcc	gcc	gcc	ctg	ctc	acc	ggc	576
Phe	Gly	Leu	Ala	Phe	Gly	His	Val	Val	Ala	Ala	Ala	Leu	Leu	Thr	Gly	
			180					185						190		
ggg	atg	ctg	atg	gcg	gcg	gtg	agc	gcc	tgg	cac	ctg	atc	cgg	cgc	acc	624
Gly	Met	Leu	Met	Ala	Ala	Val	Ser	Ala	Trp	His	Leu	Ile	Arg	Arg	Thr	
		195					200					205				
ccg	gac	cac	gcg	ctg	ttc	cgc	acg	tcg	ctg	cgg	atc	ggc	ctg	gtc	acc	672
Pro	Asp	His	Ala	Leu	Phe	Arg	Thr	Ser	Leu	Arg	Ile	Gly	Leu	Val	Thr	
	210					215					220					
gcg	gcg	gtc	tcg	atc	agc	ctg	gtg	cag	ggc	ttc	ggc	ttc	gcc	cag	ttc	720
Ala	Ala	Val	Ser	Ile	Ser	Leu	Val	Gln	Gly	Phe	Gly	Phe	Ala	Gln	Phe	
	225				230					235					240	
ggg	ccg	gtc	ggg	cag	acg	cag	ccc	acc	aag	ttc	ggc	ggc	ggc	gcg	cag	768
Gly	Pro	Val	Gly	Gln	Thr	Gln	Pro	Thr	Lys	Phe	Gly	Gly	Gly	Ala	Gln	
				245					250					255		
cgc	gac	gcc	ctg	gtc	gcc	gaa	tgg	acc	tcc	cgg	ttc	ggg	ccc	ggc	gac	816
Arg	Asp	Ala	Leu	Val	Ala	Glu	Trp	Thr	Ser	Arg	Phe	Gly	Pro	Gly	Asp	
			260					265					270			
tac	acc	ccg	ccc	gtg	ctg	gcc	gac	gtc	ggg	ctc	ggt	ttc	atg	atc	ctg	864
Tyr	Thr	Pro	Pro	Val	Leu	Ala	Asp	Val	Gly	Leu	Gly	Phe	Met	Ile	Leu	
		275					280					285				
atc	ggc	ctc	ctc	ctg	ggc	tgt	ctg	tgg	ctg	ctg	ctc	ccc	ctg	ctc	tgg	912
Ile	Gly	Leu	Leu	Leu	Gly	Cys	Leu	Trp	Leu	Leu	Leu	Pro	Leu	Leu	Trp	
	290					295					300					
cgg	gac	tgg	ttc	atc	cgg	ctg	cgc	ttc	ccg	ctc	tgg	ctg	atc	ctg	ctg	960
Arg	Asp	Trp	Phe	Ile	Arg	Leu	Arg	Phe	Pro	Leu	Trp	Leu	Ile	Leu	Leu	
	305				310					315					320	
gcg	ctg	ccg	ctg	ccc	ttc	gtc	gcg	gtg	atc	ctc	ggc	tgg	atc	gcc	cgt	1008
Ala	Leu	Pro	Leu	Pro	Phe	Val	Ala	Val	Ile	Leu	Gly	Trp	Ile	Ala	Arg	
				325					330					335		
gag	gtg	ggc	cgc	cag	ccc	tgg	gtc	gcg	tac	ggg	ctg	ctt	tcc	acc	gag	1056
Glu	Val	Gly	Arg	Gln	Pro	Trp	Val	Ala	Tyr	Gly	Leu	Leu	Ser	Thr	Glu	
			340					345					350			
cgg	gcg	gtc	tcg	ccg	gtc	gcg	ccc	ggg	gtg	atg	ctc	gcc	tcg	ctg	atc	1104
Arg	Ala	Val	Ser	Pro	Val	Ala	Pro	Gly	Val	Met	Leu	Ala	Ser	Leu	Ile	
		355					360					365				
ggc	ttc	acc	ctg	ctg	ctc	ggc	ggg	ctc	gcc	gtc	gcc	aac	tgg	gtg	ctg	1152
Gly	Phe	Thr	Leu	Leu	Leu	Gly	Gly	Leu	Ala	Val	Ala	Asn	Trp	Val	Leu	
	370					375					380					

ttc gcc cgg tac gcc gcc cgg gga gcc gcc gat ccc gcc cta ggc cgc 1200
 Phe Ala Arg Tyr Ala Ala Arg Gly Ala Ala Asp Pro Ala Leu Gly Arg
 385 390 395 400

cgg ccc ggc cca gcc gcc gac gag tcc cgt ccc gtc ccc gtc ctc ggc 1248
 Arg Pro Gly Pro Ala Ala Asp Glu Ser Arg Pro Val Pro Val Leu Gly
 405 410 415

<210> 145

<211> 416

<212> PRT

<213> Micromonospora carbonacea

<220>

<223> evcB

<400> 145

Met Asp Gln Leu Leu Leu Ala Arg Leu Gln Phe Ala Thr Thr Thr Ser
 1 5 10 15

Leu His Phe Leu Phe Val Val Val Thr Leu Gly Leu Val Thr Leu Leu
 20 25 30

Val Gly Leu Gln Thr Ala Trp Thr Ile Thr Gly Asn Pro Val His Glu
 35 40 45

Arg Leu Thr Arg Phe Trp Gly Gln Leu Tyr Val Ile Asn Tyr Val Leu
 50 55 60

Gly Ile Ala Thr Gly Leu Leu Met Glu Phe Gln Phe Gly Leu Asn Trp
 65 70 75 80

Ser Gly Leu Ser Arg Tyr Val Gly Asn Val Phe Gly Ala Pro Leu Ala
 85 90 95

Ile Glu Thr Leu Val Ala Phe Phe Leu Glu Ser Thr Phe Leu Gly Met
 100 105 110

Trp Ile Phe Gly Trp His Arg Leu Arg Arg Gly Val His Leu Ala Leu
 115 120 125

Leu Trp Gly Val Ala Leu Thr Ala Tyr Ala Ser Ala Phe Trp Val Met
 130 135 140

Val Ala Asn Ala Trp Leu Gln Asn Pro Val Gly Tyr Glu Val Arg Asp
 145 150 155 160

Gly Val Ala His Leu Thr Asp Phe Gly Ala Leu Leu Thr Asn Pro Thr
 165 170 175

Phe Gly Leu Ala Phe Gly His Val Val Ala Ala Ala Leu Leu Thr Gly
 180 185 190

Gly Met Leu Met Ala Ala Val Ser Ala Trp His Leu Ile Arg Arg Thr
 195 200 205

Pro Asp His Ala Leu Phe Arg Thr Ser Leu Arg Ile Gly Leu Val Thr
 210 215 220

Ala Ala Val Ser Ile Ser Leu Val Gln Gly Phe Gly Phe Ala Gln Phe
 225 230 235 240

Gly Pro Val Gly Gln Thr Gln Pro Thr Lys Phe Gly Gly Gly Ala Gln
 245 250 255

Arg Asp Ala Leu Val Ala Glu Trp Thr Ser Arg Phe Gly Pro Gly Asp
 260 265 270
 Tyr Thr Pro Pro Val Leu Ala Asp Val Gly Leu Gly Phe Met Ile Leu
 275 280 285
 Ile Gly Leu Leu Leu Gly Cys Leu Trp Leu Leu Leu Pro Leu Leu Trp
 290 295 300
 Arg Asp Trp Phe Ile Arg Leu Arg Phe Pro Leu Trp Leu Ile Leu Leu
 305 310 315 320
 Ala Leu Pro Leu Pro Phe Val Ala Val Ile Leu Gly Trp Ile Ala Arg
 325 330 335
 Glu Val Gly Arg Gln Pro Trp Val Ala Tyr Gly Leu Leu Ser Thr Glu
 340 345 350
 Arg Ala Val Ser Pro Val Ala Pro Gly Val Met Leu Ala Ser Leu Ile
 355 360 365
 Gly Phe Thr Leu Leu Leu Gly Gly Leu Ala Val Ala Asn Trp Val Leu
 370 375 380
 Phe Ala Arg Tyr Ala Ala Arg Gly Ala Ala Asp Pro Ala Leu Gly Arg
 385 390 395 400
 Arg Pro Gly Pro Ala Ala Asp Glu Ser Arg Pro Val Pro Val Leu Gly
 405 410 415

<210> 146
 <211> 1005
 <212> DNA
 <213> Micromonospora carbonacea

<220>
 <221> CDS
 <222> (1)..(1005)

<220>
 <223> evcC

<400> 146
 gtg gaa ctc gcc tgg tac gcc ctg ctc ggg ctc ttc ctc gcc ggc tac 48
 Val Glu Leu Ala Trp Tyr Ala Leu Leu Gly Leu Phe Leu Ala Gly Tyr
 1 5 10 15
 ctg gtc ctc ggc ggc tac gac tac ggc gtc ggc ctg ctg ctc gcc cgg 96
 Leu Val Leu Gly Gly Tyr Asp Tyr Gly Val Gly Leu Leu Leu Ala Arg
 20 25 30
 ggc ggc ccg ccg gcc cgc cgc cgg gcg gcc ctc acc gcc gtg ggc ccg 144
 Gly Gly Pro Pro Ala Arg Arg Arg Ala Ala Leu Thr Ala Val Gly Pro
 35 40 45
 ttc ttc ctc ggc aac gag gtc tgg ctg gtg gcg acc gtc ggc att ctg 192
 Phe Phe Leu Gly Asn Glu Val Trp Leu Val Ala Thr Val Gly Ile Leu
 50 55 60
 ttc ggc gcg ttc ccc acc ctg gag ggg gaa ctg ctg tcc ggc ttc tac 240
 Phe Gly Ala Phe Pro Thr Leu Glu Gly Glu Leu Ser Gly Phe Tyr
 65 70 75 80

ccc	gtc	gtc	gcc	gcc	gcg	ctg	gcc	ggg	gtg	atc	atg	gtg	acc	gtc	ggc	288
Pro	Val	Val	Ala	Ala	Ala	Leu	Ala	Gly	Val	Ile	Met	Val	Thr	Val	Gly	
			85						90					95		
gtg	caa	ctg	cgc	agc	cgc	ccg	acc	gac	gag	ccg	acc	cgc	gcc	gcc	tgg	336
Val	Gln	Leu	Arg	Ser	Arg	Pro	Thr	Asp	Glu	Pro	Thr	Arg	Ala	Ala	Trp	
			100					105					110			
gac	cgg	atg	gtg	gcc	gcc	ggg	agc	ctg	ctc	gcc	gcg	ttc	ggc	tgg	ggg	384
Asp	Arg	Met	Val	Ala	Ala	Gly	Ser	Leu	Leu	Ala	Ala	Phe	Gly	Trp	Gly	
		115					120					125				
gcg	ctg	ctc	gcc	ggg	ctg	ctc	cag	ggc	gta	ccg	ctg	gcc	gcc	gac	ggg	432
Ala	Leu	Leu	Ala	Gly	Leu	Leu	Gln	Gly	Val	Pro	Leu	Ala	Ala	Asp	Gly	
	130					135					140					
cac	gtc	acg	ggc	gtc	ggc	cac	gtg	gcc	acc	ccg	ttc	gcg	gcc	ctc	gcc	480
His	Val	Thr	Gly	Val	Gly	His	Val	Ala	Thr	Pro	Phe	Ala	Ala	Leu	Ala	
145					150					155					160	
ggg	ctg	gcg	atg	acg	gcc	ctg	gtg	gcg	gtg	cac	ggc	gcg	acg	ttc	ctc	528
Gly	Leu	Ala	Met	Thr	Ala	Leu	Val	Ala	Val	His	Gly	Ala	Thr	Phe	Leu	
				165					170					175		
acg	ctc	cgg	ctg	tcg	gcc	gcc	gac	gcc	gca	ccg	ctg	gcc	cgt	acc	gcc	576
Thr	Leu	Arg	Leu	Ser	Ala	Ala	Asp	Ala	Ala	Pro	Leu	Ala	Arg	Thr	Ala	
			180					185					190			
cgc	cgg	ctg	gtc	gcg	gtg	gcg	ctc	gcc	gcc	gtc	gcc	ctg	gcc	gcc	gtc	624
Arg	Arg	Leu	Val	Ala	Val	Ala	Leu	Ala	Ala	Val	Ala	Leu	Ala	Ala	Val	
		195					200					205				
gcg	ggc	gcg	ctc	tcc	gat	cgg	gta	cgc	gcc	gcg	acg	cag	cgc	ccg	ctg	672
Ala	Gly	Ala	Leu	Ser	Asp	Arg	Val	Arg	Ala	Ala	Thr	Gln	Arg	Pro	Leu	
	210					215					220					
ccg	gcc	gta	ctg	ctg	ccg	ttg	gta	ctg	gtg	gcg	gcg	ctg	ctg	gtg	gcc	720
Pro	Ala	Val	Leu	Leu	Pro	Leu	Val	Leu	Val	Ala	Ala	Leu	Leu	Val	Ala	
225					230					235				240		
cgg	gcg	gcg	cac	gcg	cgg	cac	ctg	ccc	ggg	gtg	gcc	ttc	gcc	gcc	act	768
Arg	Ala	Ala	His	Ala	Arg	His	Leu	Pro	Gly	Val	Ala	Phe	Ala	Ala	Thr	
			245						250					255		
tcg	gcg	gcg	ctg	gcg	ctg	ccg	gtg	gcg	gga	gtc	ggc	gcg	gcg	ttg	tgg	816
Ser	Ala	Ala	Leu	Ala	Leu	Pro	Val	Ala	Gly	Val	Gly	Ala	Ala	Leu	Trp	
			260					265					270			
ccc	tac	gcg	ctg	gtc	tcc	acc	gtc	gca	ccg	acg	gca	tca	ctg	agc	gtg	864
Pro	Tyr	Ala	Leu	Val	Ser	Thr	Val	Ala	Pro	Thr	Ala	Ser	Leu	Ser	Val	
		275					280					285				
acc	gac	gcg	gcg	gcc	agc	ggg	ccg	acg	ctg	acg	gtg	ctg	ggc	tgg	ctg	912
Thr	Asp	Ala	Ala	Ala	Ser	Gly	Pro	Thr	Leu	Thr	Val	Leu	Gly	Trp	Leu	
	290					295					300					
gcg	cta	ccg	ctc	ctg	ccg	gcc	cta	cta	ggc	ttc	cag	gcg	atg	tgc	tgg	960
Ala	Leu	Pro	Leu	Leu	Pro	Ala	Leu	Leu	Gly	Phe	Gln	Ala	Met	Cys	Trp	
305					310					315				320		
tgg	gtg	ttc	cgg	gga	cga	acc	gac	ggc	agg	gca	ccg	gtg	tac	tgg		1005
Trp	Val	Phe	Arg	Gly	Arg	Thr	Asp	Gly	Arg	Ala	Pro	Val	Tyr	Trp		
				325					330					335		

<210> 147
 <211> 335
 <212> PRT
 <213> Micromonospora carbonacea

<220>
 <223> evcC

<400> 147
 Val Glu Leu Ala Trp Tyr Ala Leu Leu Gly Leu Phe Leu Ala Gly Tyr
 1 5 10 15
 Leu Val Leu Gly Gly Tyr Asp Tyr Gly Val Gly Leu Leu Leu Ala Arg
 20 25 30
 Gly Gly Pro Pro Ala Arg Arg Arg Ala Ala Leu Thr Ala Val Gly Pro
 35 40 45
 Phe Phe Leu Gly Asn Glu Val Trp Leu Val Ala Thr Val Gly Ile Leu
 50 55 60
 Phe Gly Ala Phe Pro Thr Leu Glu Gly Glu Leu Leu Ser Gly Phe Tyr
 65 70 75 80
 Pro Val Val Ala Ala Ala Leu Ala Gly Val Ile Met Val Thr Val Gly
 85 90 95
 Val Gln Leu Arg Ser Arg Pro Thr Asp Glu Pro Thr Arg Ala Ala Trp
 100 105 110
 Asp Arg Met Val Ala Ala Gly Ser Leu Leu Ala Ala Phe Gly Trp Gly
 115 120 125
 Ala Leu Leu Ala Gly Leu Leu Gln Gly Val Pro Leu Ala Ala Asp Gly
 130 135 140
 His Val Thr Gly Val Gly His Val Ala Thr Pro Phe Ala Ala Leu Ala
 145 150 155 160
 Gly Leu Ala Met Thr Ala Leu Val Ala Val His Gly Ala Thr Phe Leu
 165 170 175
 Thr Leu Arg Leu Ser Ala Ala Asp Ala Ala Pro Leu Ala Arg Thr Ala
 180 185 190
 Arg Arg Leu Val Ala Val Ala Leu Ala Ala Val Ala Leu Ala Ala Val
 195 200 205
 Ala Gly Ala Leu Ser Asp Arg Val Arg Ala Ala Thr Gln Arg Pro Leu
 210 215 220
 Pro Ala Val Leu Leu Pro Leu Val Leu Val Ala Ala Leu Leu Val Ala
 225 230 235 240
 Arg Ala Ala His Ala Arg His Leu Pro Gly Val Ala Phe Ala Ala Thr
 245 250 255
 Ser Ala Ala Leu Ala Leu Pro Val Ala Gly Val Gly Ala Ala Leu Trp
 260 265 270
 Pro Tyr Ala Leu Val Ser Thr Val Ala Pro Thr Ala Ser Leu Ser Val
 275 280 285
 Thr Asp Ala Ala Ala Ser Gly Pro Thr Leu Thr Val Leu Gly Trp Leu

290					295					300						
Ala	Leu	Pro	Leu	Leu	Pro	Ala	Leu	Leu	Gly	Phe	Gln	Ala	Met	Cys	Trp	
305					310					315					320	
Trp	Val	Phe	Arg	Gly	Arg	Thr	Asp	Gly	Arg	Ala	Pro	Val	Tyr	Trp		
				325					330					335		
<210> 148																
<211> 1683																
<212> DNA																
<213> Micromonospora carbonacea																
<220>																
<221> CDS																
<222> (1) .. (1683)																
<220>																
<223> evcD																
<400> 148																
gtg	ctc	gcg	gtg	ctc	ggc	ggg	ctg	acg	gcg	ctg	ctg	gtc	gtg	ggg	cag	48
Val	Leu	Ala	Val	Leu	Gly	Gly	Leu	Thr	Ala	Leu	Leu	Val	Val	Gly	Gln	
1				5					10					15		
gcc	acc	gcg	ctg	gcc	acg	gtg	ctg	gcc	gcc	gcg	ctc	gac	ggg	cgg	ttg	96
Ala	Thr	Ala	Leu	Ala	Thr	Val	Leu	Ala	Ala	Ala	Leu	Asp	Gly	Arg	Leu	
			20					25					30			
gcc	cgg	ccg	gcg	ctc	gcc	ggt	ttc	ctg	gcc	gcc	gtg	gtg	ggg	cgg	gcg	144
Ala	Arg	Pro	Ala	Leu	Ala	Gly	Phe	Leu	Ala	Ala	Val	Val	Gly	Arg	Ala	
		35					40					45				
ctg	gtc	gcc	tgg	gcc	cag	ggc	acg	gtg	gcg	gcg	cgg	gcc	gcc	gcg	acg	192
Leu	Val	Ala	Trp	Ala	Gln	Gly	Thr	Val	Ala	Ala	Arg	Ala	Ala	Ala	Thr	
	50					55					60					
gtc	aag	gcg	gcg	ctg	cgg	gcc	gac	ctg	ctc	gcc	gcc	gtc	ggc	cgg	cac	240
Val	Lys	Ala	Ala	Leu	Arg	Ala	Asp	Leu	Leu	Ala	Ala	Val	Gly	Arg	His	
65					70					75					80	
ggt	ccc	ggc	tgg	gtc	gcc	ggg	cag	cgg	gcc	ggg	cag	ctc	gcc	acc	ctg	288
Gly	Pro	Gly	Trp	Val	Ala	Gly	Gln	Arg	Ala	Gly	Gln	Leu	Ala	Thr	Leu	
				85					90					95		
gcc	ggg	cgg	ggg	ctg	gac	gcc	ctg	gac	gcc	tac	ttc	acc	ggg	tac	ctt	336
Ala	Gly	Arg	Gly	Leu	Asp	Ala	Leu	Asp	Ala	Tyr	Phe	Thr	Gly	Tyr	Leu	
			100					105					110			
ccg	cag	ctc	gtg	ctc	agc	gtc	acc	gtc	ccg	gtg	gcc	gtg	ctg	gcc	cgg	384
Pro	Gln	Leu	Val	Leu	Ser	Val	Thr	Val	Pro	Val	Ala	Val	Leu	Ala	Arg	
			115				120					125				
atc	acc	ttc	gcc	gac	tgg	ggc	tgc	gcc	gtc	atc	gtc	gcg	ctg	acc	ctg	432
Ile	Thr	Phe	Ala	Asp	Trp	Gly	Ser	Ala	Val	Ile	Val	Ala	Leu	Thr	Leu	
	130					135					140					
ccg	ctg	atc	ccg	gtc	ttc	ggg	gcg	ctg	ctc	ggc	tgg	cag	gcg	cag	gcc	480
Pro	Leu	Ile	Pro	Val	Phe	Gly	Ala	Leu	Leu	Gly	Trp	Gln	Ala	Gln	Al	

				165				170				175							
ctc Leu	gac Asp	atg Met	gtc Val 180	gcc Ala	ggc Gly	ctg Leu	ccc Pro	acg Thr 185	ctg Leu	cgc Arg	gcg Ala	ttc Phe	ggc Gly 190	cgg Arg	gcc Ala	576			
cgg Arg	ggc Gly	cag Gln 195	gtc Val	gag Glu	gtg Val	gtc Val	cgc Arg 200	cgg Arg	atg Met	gcc Ala	gac Asp	ggg Gly 205	cac His	cgc Arg	gcc Ala	624			
gcg Ala	acg Thr 210	atg Met	cgc Arg	acg Thr	ctg Leu	cgg Arg 215	atc Ile	gcg Ala	ttc Phe	ctg Leu	tcc Ser 220	gcg Ala	ctg Leu	gtg Val	ctg Leu	672			
gag Glu 225	ctg Leu	gtc Val	gcc Ala	acc Thr	ctg Leu 230	tcg Ser	gtg Val	gcg Ala	ctg Leu	gtc Val 235	gcg Ala	gtg Val	cgc Pro	gtg Val	ggc Gly 240	720			
atc Ile	cgg Arg	ctg Leu	ctc Leu	ggc Gly 245	ggc Gly	ggg Gly	ctg Leu	gcg Ala	ctg Leu 250	tcc Ser	acc Thr	gcg Ala	ctg Leu	ctg Leu 255	gtg Val	768			
ctg Leu	ctg Leu	ctc Leu	acc Thr 260	cgc Pro	gag Glu	gcg Ala	tac Tyr	ctg Leu 265	cgc Pro	ctg Leu	cgg Arg	gcg Ala	gcc Ala 270	ggc Gly	agc Ser	816			
cgg Arg	ttc Phe	cac His 275	gcc Ala	agc Ser	atg Met	gag Glu	ggg Gly 280	ctg Leu	gcc Ala	gcg Ala	ctg Leu	gac Asp 285	gag Glu	gca Ala	ctg Leu	864			
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acc Thr	ctg Leu	ctc Leu 355	aac Asn	ctg Leu	ctg Leu	ctc Leu	ggc Gly 360	ttc Phe	gtc Val	gcc Ala	cgc Pro	acg Thr 365	cag Gln	ggc Gly	cgc Arg	1104			
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gcg Ala	ctc Leu	gcc Ala	ggc Gly 420	gcg Ala	gtc Val	gcc Ala	gcc Ala	gcc Ala 425	gcg Ala	ctg Leu	gac Asp	gag Glu 430	gtg Val	gtc Val	gcc Ala	1296			

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 Leu Leu Ala Ala Ala Thr Glu Phe Ala Gly Leu Ala Leu Met Ala Thr
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 Ala Thr Trp Leu Leu Met Ser Ala Ala Gly Arg Pro Pro Leu Asp Arg
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 ctc acc gtg gcg atc gtc gcg gtc cgg gcg ctg gcg atc agc cga ggc 288
 Leu Thr Val Ala Ile Val Ala Val Arg Ala Leu Ala Ile Ser Arg Gly
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 Val Phe Arg Tyr Thr Glu Arg Leu Ala Gly His Asp Ala Val Leu Arg

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Arg	Asp	Ala	Ala	Arg	Gln	Arg	Thr	Gly	Asp	Ala	Leu	Ser	Arg	Leu	Val	
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tcc	gac	gtg	gag	gcc	gtg	cag	gac	ctg	ctg	ctg	cgg	gtg	ctc	gtc	ccg	480
Ser	Asp	Val	Glu	Ala	Val	Gln	Asp	Leu	Leu	Leu	Arg	Val	Leu	Val	Pro	
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Tyr	Ala	Leu	Asp	Ala	Ala	Ala	Asp	Arg	Ala	Arg	Arg	Leu	Ala	Arg	Leu	
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Glu	Arg	Arg	Leu	Ala	Ala	Thr	Gly	Phe	Ala	Val	Asp	Ala	Ala	Gly	Ala	
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ggc Gly	gga Gly	cag Gln	ctc Leu	tcc Ser	ggc Gly	ggc Gly	cag Gln	cgg Arg	cag Gln	cgc Arg	ctc Leu	gcg Ala	ctg Leu	gcc Ala	cgg Arg	1536		
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Val Phe Arg Tyr Thr Glu Arg Leu Ala Gly His Asp Ala Val Leu Arg
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Met Ile Thr Asp Val Arg Ala Gly Val Phe Ala Ala Leu Ala Ala Arg
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Gly Ala Ala Ala Thr Val Val Ser Val Leu Ala Val Ala Gly Ala Thr
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Thr Ile Ser Leu Pro Ala Ala Gly Val Leu Ala Leu Gly Leu Leu Val
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Tyr Ala Leu Asp Ala Ala Ala Asp Arg Ala Arg Arg Leu Ala Arg Leu
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Glu Arg Arg Leu Ala Ala Thr Gly Phe Ala Val Asp Ala Ala Gly Ala
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Leu Val Ala Gly Val Thr Ala Gly Thr Val Val Val Thr Ala Leu Arg
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Asp Gly Val Gly Gly Val Leu Val Gly Val Leu Ala Val Gly Ser Leu

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 Pro Gly Pro Pro Ala Ala Tyr Arg Leu Leu Ser Ala Ser Val Asp Gly
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 Ile Trp Leu Gly Ala Val Val Leu Ser Val Ala Gly Leu Leu Leu Val
 130 135 140

gcc gcc tcg gcc cgg tgg gcg cac ccg gcc ctg ccc cgg ctc gcc cgg 480
 Ala Ala Ser Ala Arg Trp Ala His Pro Ala Leu Pro Arg Leu Ala Arg
 145 150 155 160

ctg acc ggt ctc ggg ctc acc gcc acg ctc gtc ctg ggc gtg gcg acc 528
 Leu Thr Gly Leu Gly Leu Thr Ala Thr Leu Val Leu Gly Val Ala Thr
 165 170 175

ggc gcg gcc ctg tac gcc tgg tcg atc ggg ctc tgg gag gcg gcc cgc 576
 Gly Ala Ala Leu Tyr Ala Trp Ser Ile Gly Leu Trp Glu Ala Ala Arg
 180 185 190

acc tgg ccg ccg atg ctc gtg ggc gcg ctg gtc tgc ggc gcg ggg ttc 624
 Thr Trp Pro Pro Met Leu Val Gly Ala Leu Val Cys Gly Ala Gly Phe
 195 200 205

ttc tgg atc ggt cgg gcg gcc cgg tcc tgg ctg ctc tcg gca cgc cga 672

Phe Trp Ile Gly Arg Ala Ala Arg Ser Trp Leu Leu Ser Ala Arg Arg
 210 215 220

ccg gcc gga ccg gcg
 Pro Ala Gly Pro Ala
 225

687

<210> 153
 <211> 229
 <212> PRT
 <213> Micromonospora carbonacea

<220>
 <223> evcF

<400> 153
 Met Val Arg Cys Asp Asp Val Leu Val Lys Glu Arg Leu Arg Glu Leu
 1 5 10 15
 Ser Asp Arg Leu His Gly Pro Ala Arg Leu Lys Ala Asp Leu Leu Ala
 20 25 30
 Glu Ala Arg His Ala Leu Gln Asp Ala Val Glu Ala Tyr Arg Asp Gly
 35 40 45
 Gly Leu Pro Ala Ala Glu Ala Glu Arg Arg Ala Val Ala Glu Phe Gly
 50 55 60
 Glu Pro Ala Arg Leu Ala Pro Ala Tyr Gln Ala Glu Leu Ala Ala Gly
 65 70 75 80
 Ser Leu Arg Gly Leu Ser Leu Arg Val Leu Ala Val Ala Gly Val Leu
 85 90 95
 Val Val Ala Gly Asp Leu Thr Trp Gln Gly Ser Ser Trp Ser Gly Gly
 100 105 110
 Pro Gly Pro Pro Ala Ala Tyr Arg Leu Leu Ser Ala Ser Val Asp Gly
 115 120 125
 Ile Trp Leu Gly Ala Val Val Leu Ser Val Ala Gly Leu Leu Leu Val
 130 135 140
 Ala Ala Ser Ala Arg Trp Ala His Pro Ala Leu Pro Arg Leu Ala Arg
 145 150 155 160
 Leu Thr Gly Leu Gly Leu Thr Ala Thr Leu Val Leu Gly Val Ala Thr
 165 170 175
 Gly Ala Ala Leu Tyr Ala Trp Ser Ile Gly Leu Trp Glu Ala Ala Arg
 180 185 190
 Thr Trp Pro Pro Met Leu Val Gly Ala Leu Val Cys Gly Ala Gly Phe
 195 200 205
 Phe Trp Ile Gly Arg Ala Ala Arg Ser Trp Leu Leu Ser Ala Arg Arg
 210 215 220
 Pro Ala Gly Pro Ala
 225

<210> 154

<211> 333
 <212> DNA
 <213> Micromonospora carbonacea

<220>
 <221> CDS
 <222> (1)..(333)

<220>
 <223> evcG

<400> 154
 atg aag gcc cag gcg ctg cac gga cac ctc gac gcg ctg ctg ctc gcg 48
 Met Lys Ala Gln Ala Leu His Gly His Leu Asp Ala Leu Leu Leu Ala
 1 5 10 15
 gtg ctg gaa cgg ggc gcg ctg cac ggc tac gcc atc atc gag gcg ctg 96
 Val Leu Glu Arg Gly Ala Leu His Gly Tyr Ala Ile Ile Glu Ala Leu
 20 25 30
 cgc gcg cgc agc gag ggc agc ctc gat ctg cct acc ggg acg atc tac 144
 Arg Ala Arg Ser Glu Gly Ser Leu Asp Leu Pro Thr Gly Thr Ile Tyr
 35 40 45
 ccg gcg ctg cgc cgg ctg gag cgg gcg ggg cac gtg gtc agc agt tgg 192
 Pro Ala Leu Arg Arg Leu Glu Arg Ala Gly His Val Val Ser Ser Trp
 50 55 60
 agc acc gtc aac ggc cgc gag cgc cgc acc tac gag ctg acc gac tcc 240
 Ser Thr Val Asn Gly Arg Glu Arg Arg Thr Tyr Glu Leu Thr Asp Ser
 65 70 75 80
 ggc cgc cgg gcc ctc gcc ggg gaa cgg gcc ggc tgg cgg gag ttc agc 288
 Gly Arg Arg Ala Leu Ala Gly Glu Arg Ala Gly Trp Arg Glu Phe Ser
 85 90 95
 gcg acc gtc ggc cag ttc ctc ggc gac acc ccc gcc acg ccg gcc 333
 Ala Thr Val Gly Gln Phe Leu Gly Asp Thr Pro Ala Thr Pro Ala
 100 105 110

<210> 155
 <211> 111
 <212> PRT
 <213> Micromonospora carbonacea

<220>
 <223> evcG

<400> 155
 Met Lys Ala Gln Ala Leu His Gly His Leu Asp Ala Leu Leu Leu Ala
 1 5 10 15
 Val Leu Glu Arg Gly Ala Leu His Gly Tyr Ala Ile Ile Glu Ala Leu
 20 25 30
 Arg Ala Arg Ser Glu Gly Ser Leu Asp Leu Pro Thr Gly Thr Ile Tyr
 35 40 45
 Pro Ala Leu Arg Arg Leu Glu Arg Ala Gly His Val Val Ser Ser Trp
 50 55 60
 Ser Thr Val Asn Gly Arg Glu Arg Arg Thr Tyr Glu Leu Thr Asp Ser
 65 70 75 80

Gly Arg Arg Ala Leu Ala Gly Glu Arg Ala Gly Trp Arg Glu Phe Ser
 85 90 95

Ala Thr Val Gly Gln Phe Leu Gly Asp Thr Pro Ala Thr Pro Ala
 100 105 110

<210> 156

<211> 909

<212> DNA

<213> Micromonospora carbonacea

<220>

<221> CDS

<222> (1) .. (909)

<220>

<223> evcH

<400> 156

gtg ggc agc ccg aag cac acg gag gtc agc gtg gcc cgc cag tcg ccc 48
 Val Gly Ser Pro Lys His Thr Glu Val Ser Val Ala Arg Gln Ser Pro
 1 5 10 15

caa cgg ccc gac gcc gac gag cct gag ctc gac gag acc gac ggc acc 96
 Gln Arg Pro Asp Ala Asp Glu Pro Glu Leu Asp Glu Thr Asp Gly Thr
 20 25 30

gcc gca gag gtc gaa gag gac ggc gcg cgc ccg tcg gcg cag gac gcc 144
 Ala Ala Glu Val Glu Glu Asp Gly Ala Arg Pro Ser Ala Gln Asp Ala
 35 40 45

gac cgc gcg ctc tgg gac gag ctg cgc atc gac ccg gtc gag atc gcc 192
 Asp Arg Ala Leu Trp Asp Glu Leu Arg Ile Asp Pro Val Glu Ile Ala
 50 55 60

ctg ccc gcc ggc acc ggc tac acg ctg cgg gcg tac cgg ccg gca cgg 240
 Leu Pro Ala Gly Thr Gly Tyr Thr Leu Arg Ala Tyr Arg Pro Ala Arg
 65 70 75 80

gag ttg acc ccg acc gac gtc gcc gag cgc gac cag gac gac ccg ttc 288
 Glu Leu Thr Pro Thr Asp Val Ala Glu Arg Asp Gln Asp Asp Pro Phe
 85 90 95

ctg gcc cgc cgg cag gcg gtc gag acc gac gag gac gag gac gag gtc 336
 Leu Ala Arg Arg Gln Ala Val Glu Thr Asp Glu Asp Glu Asp Glu Val
 100 105 110

atc atc ctc gac gag gag gtg gcc gcc gag ttc gcc gag gcg gac gcg 384
 Ile Ile Leu Asp Glu Glu Val Ala Ala Glu Phe Ala Glu Ala Asp Ala
 115 120 125

gag gag gcc ggc ggg aag tcc cgc tcc cgc aag ccc cgc gcc gac gcg 432
 Glu Glu Ala Gly Gly Lys Ser Arg Ser Arg Lys Pro Arg Ala Asp Ala
 130 135 140

gac tcc gac gac gcc gga gcc gcc aca gac gcg gac gcg gag gag gag 480
 Asp Ser Asp Asp Ala Gly Ala Ala Thr Asp Ala Asp Ala Glu Glu Glu
 145 150 155 160

ccg gac tcc gac gag gac gag gcg ggc gac gag gag gtt ccg gtc ttc 528
 Pro Asp Ser Asp Glu Asp Glu Ala Gly Asp Glu Glu Val Pro Val Phe
 165 170 175

ctc agc cac cgg ggc agg ctg ctg ctg ttc aag acg ccc gaa tcc ctc 576
 Leu Ser His Arg Gly Arg Leu Leu Leu Phe Lys Thr Pro Glu Ser Leu
 180 185 190

gtc agc ttc gtc cgg tcc ggc gca ccc aac gac atg tct caa ctg gac 624
 Val Ser Phe Val Arg Ser Gly Ala Pro Asn Asp Met Ser Gln Leu Asp
 195 200 205

agc tgg aat gaa ctg tcc gaa cgg gtg gag ccg gcc gac atc gtc ccg 672
 Ser Trp Asn Glu Leu Ser Glu Arg Val Glu Pro Ala Asp Ile Val Pro
 210 215 220

ctc gac gag gac acc tac gag ctg gac ctg gtc gtg gag aac ctg cgg 720
 Leu Asp Glu Asp Thr Tyr Glu Leu Asp Leu Val Val Glu Asn Leu Arg
 225 230 235 240

ggg ggg cac gac acc tgg gac tcg gcg ctg ctg atc gag ccg gcg agg 768
 Gly Gly His Asp Thr Trp Asp Ser Ala Leu Leu Ile Glu Pro Ala Arg
 245 250 255

tgg ccc ggg acg tcg cgt atg ccc tgc gtc tgc ccg ccg tgt tgg aca 816
 Trp Pro Gly Thr Ser Arg Met Pro Cys Val Cys Pro Pro Cys Trp Thr
 260 265 270

tgc tct ccg ccg gct cca gcc tcg acg acc tgg acg agg cgc tgc gcg 864
 Cys Ser Pro Pro Ala Pro Ala Ser Thr Thr Trp Thr Arg Arg Cys Ala
 275 280 285

cca cgg cca acg gcg ggc tcg ggg gct tcc tcg gcc gcc ggc ggc 909
 Pro Arg Pro Thr Ala Gly Ser Gly Ala Ser Ser Ala Ala Gly Gly
 290 295 300

<210> 157

<211> 303

<212> PRT

<213> Micromonospora carbonacea

<220>

<223> evcH

<400> 157

Val Gly Ser Pro Lys His Thr Glu Val Ser Val Ala Arg Gln Ser Pro
 1 5 10 15

Gln Arg Pro Asp Ala Asp Glu Pro Glu Leu Asp Glu Thr Asp Gly Thr
 20 25 30

Ala Ala Glu Val Glu Glu Asp Gly Ala Arg Pro Ser Ala Gln Asp Ala
 35 40 45

Asp Arg Ala Leu Trp Asp Glu Leu Arg Ile Asp Pro Val Glu Ile Ala
 50 55 60

Leu Pro Ala Gly Thr Gly Tyr Thr Leu Arg Ala Tyr Arg Pro Ala Arg
 65 70 75 80

Glu Leu Thr Pro Thr Asp Val Ala Glu Arg Asp Gln Asp Asp Pro Phe
 85 90 95

Leu Ala Arg Arg Gln Ala Val Glu Thr Asp Glu Asp Glu Asp Glu Val
 100 105 110

Ile Ile Leu Asp Glu Glu Val Ala Ala Glu Phe Ala Glu Ala Asp Ala
 115 120 125

Glu Glu Ala Gly Gly Lys Ser Arg Ser Arg Lys Pro Arg Ala Asp Ala
 130 135 140
 Asp Ser Asp Asp Ala Gly Ala Ala Thr Asp Ala Asp Ala Glu Glu Glu
 145 150 155 160
 Pro Asp Ser Asp Glu Asp Glu Ala Gly Asp Glu Glu Val Pro Val Phe
 165 170 175
 Leu Ser His Arg Gly Arg Leu Leu Leu Phe Lys Thr Pro Glu Ser Leu
 180 185 190
 Val Ser Phe Val Arg Ser Gly Ala Pro Asn Asp Met Ser Gln Leu Asp
 195 200 205
 Ser Trp Asn Glu Leu Ser Glu Arg Val Glu Pro Ala Asp Ile Val Pro
 210 215 220
 Leu Asp Glu Asp Thr Tyr Glu Leu Asp Leu Val Val Glu Asn Leu Arg
 225 230 235 240
 Gly Gly His Asp Thr Trp Asp Ser Ala Leu Leu Ile Glu Pro Ala Arg
 245 250 255
 Trp Pro Gly Thr Ser Arg Met Pro Cys Val Cys Pro Pro Cys Trp Thr
 260 265 270
 Cys Ser Pro Pro Ala Pro Ala Ser Thr Thr Trp Thr Arg Arg Cys Ala
 275 280 285
 Pro Arg Pro Thr Ala Gly Ser Gly Ala Ser Ser Ala Ala Gly Gly
 290 295 300

<210> 158
 <211> 2073
 <212> DNA
 <213> Micromonospora carbonacea

<220>
 <221> CDS
 <222> (1)..(2073)

<220>
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<400> 158
 atg cag tcc gcg ccg gcc gag cgg cgg gcg gtc ggg ctg gcc cgg gcg 48
 Met Gln Ser Ala Pro Ala Glu Arg Arg Ala Val Gly Leu Ala Arg Ala
 1 5 10 15
 ctc cag gcc ggc gcg ctc tcg gcg gtc acc ctc ccg gcg ccc cgg gat 96
 Leu Gln Ala Gly Ala Leu Ser Ala Val Thr Leu Pro Ala Pro Arg Asp
 20 25 30
 ctc gcc ggc tac aag cag gtc ctc tcg gcg cac gcc gcg ctc gcc agc 144
 Leu Ala Gly Tyr Lys Gln Val Leu Ser Ala His Ala Ala Leu Ala Ser
 35 40 45
 ggc cgg cac tcc gcc gcc gtg gcg ctg cgc gag gtg ctg cgg gag ctc 192
 Gly Arg His Ser Ala Ala Val Ala Leu Arg Glu Val Leu Arg Glu Leu
 50 55 60

tac	ccg	gcc	gcc	ctg	cgc	gcg	tac	ccg	gac	ccg	gcc	gag	ccg	gtc	gcc	240
Tyr	Pro	Ala	Ala	Leu	Arg	Ala	Tyr	Pro	Asp	Pro	Ala	Glu	Pro	Val	Ala	
65					70					75					80	
ctg	gcc	gtg	ttg	gac	gcc	ctg	ccc	gag	ccc	ggc	atg	ctg	ggc	ggg	acg	288
Leu	Ala	Val	Leu	Asp	Ala	Leu	Pro	Glu	Pro	Gly	Met	Leu	Gly	Gly	Thr	
				85					90					95		
atc	gcc	cgg	ggc	cgg	gag	gtg	tcg	gtg	gcg	gcg	gac	gcc	atc	gcc	gcc	336
Ile	Ala	Arg	Gly	Arg	Glu	Val	Ser	Val	Ala	Ala	Asp	Ala	Ile	Ala	Ala	
			100					105					110			
cac	ctc	gcg	gcc	gac	ggg	gtg	gcc	gac	gaa	ggc	aag	atc	aac	gat	gcg	384
His	Leu	Ala	Ala	Asp	Gly	Val	Ala	Asp	Glu	Gly	Lys	Ile	Asn	Asp	Ala	
		115					120					125				
gtg	acc	gcg	ctg	cgg	gtc	gcc	atc	gcc	gag	acc	ccc	cgc	cgc	gcg	gcg	432
Val	Thr	Ala	Leu	Arg	Val	Ala	Ile	Ala	Glu	Thr	Pro	Arg	Arg	Ala	Ala	
	130					135					140					
gtc	agc	cgg	gcg	ctc	acc	tcc	gcc	gtg	gcg	gag	acg	gtc	cgt	cag	gcg	480
Val	Ser	Arg	Ala	Leu	Thr	Ser	Ala	Val	Ala	Glu	Thr	Val	Arg	Gln	Ala	
145					150					155				160		
gtg	gcc	tcg	gtg	cga	gca	tgc	gac	gcg	ggc	tgc	gag	gcc	ctg	gtc	ggc	528
Val	Ala	Ser	Val	Arg	Ala	Cys	Asp	Ala	Gly	Cys	Glu	Ala	Leu	Val	Gly	
				165					170					175		
gcg	ctc	gac	gcc	cgg	gtc	acc	acc	ccc	acc	ccg	gtg	ccg	ggc	cgg	cgg	576
Ala	Leu	Asp	Ala	Arg	Val	Thr	Thr	Pro	Thr	Pro	Val	Pro	Gly	Arg	Arg	
			180					185					190			
gcc	gcc	gcc	cgc	cgg	ggc	gag	ccg	gtc	gcc	gag	ttg	ccc	ggc	gcc	ggc	624
Ala	Ala	Ala	Arg	Arg	Gly	Glu	Pro	Val	Ala	Glu	Leu	Pro	Gly	Ala	Gly	
		195					200					205				
ctg	cgc	gca	ctg	cgg	ccc	aca	gag	ccc	gag	ccg	gtc	ccc	ggc	cgg	cgc	672
Leu	Arg	Ala	Leu	Arg	Pro	Thr	Glu	Pro	Glu	Pro	Val	Pro	Gly	Arg	Arg	
	210					215					220					
agc	cgt	ccc	gag	ccg	gtc	ccc	ggc	ggc	agc	ctg	ccc	gcc	cag	ccc	cgc	720
Ser	Arg	Pro	Glu	Pro	Val	Pro	Gly	Gly	Ser	Leu	Pro	Ala	Gln	Pro	Arg	
225					230					235					240	
ccg	ctc	ggc	ccg	ccg	ccg	gtc	gcg	ccg	gag	ccc	gtc	gcc	ccg	ccg	ccg	768
Pro	Leu	Gly	Pro	Pro	Pro	Val	Ala	Pro	Glu	Pro	Val	Ala	Pro	Pro	Pro	
				245					250					255		
gtc	gcc	ccg	cgc	ccg	atc	acc	ccg	gcc	gcc	tcg	gcc	acc	ccg	ccg	gtc	816
Val	Ala	Pro	Arg	Pro	Ile	Thr	Pro	Ala	Ala	Ser	Ala	Thr	Pro	Pro	Val	
			260					265					270			
tcc	ggc	ccg	ccg	tcg	ccc	gag	ccg	cgc	cgc	ctg	atc	gac	aac	ccg	gcc	864
Ser	Gly	Pro	Pro	Ser	Pro	Glu	Pro	Arg	Arg	Leu	Ile	Asp	Asn	Pro	Ala	
		275					280					285				
aac	cgg	ccg	gtc	tcc	gcg	ccg	ccg	ccc	ccg	cca	ccg	ggg	atc	acc	ccg	912
Asn	Arg	Pro	Val	Ser	Ala	Pro	Pro	Pro	Pro	Pro	Pro	Gly	Ile	Thr	Pro	
	290					295					300					
atc	gcg	ccg	agc	cag	cgc	gag	cgc	ggg	tcc	gtg	ccg	ccg	gcc	gag	gcc	960
Ile	Ala	Pro	Ser	Gln	Arg	Glu	Arg	Gly	Ser	Val	Pro	Pro	Ala	Glu	Ala	
305					310					315					320	
ggt	gag	ccg	ttc	cgg	ccc	acg	ctg	acc	acc	gcc	gcg	atc	cag	aac	gcg	1008

Gly	Glu	Pro	Phe	Arg 325	Pro	Thr	Leu	Thr	Thr 330	Ala	Ala	Ile	Gln	Asn 335	Ala		
cgg	gcg	gag	cgg	cag	cgc	acc	atc	atc	ccg	cct	cgc	ccc	aag	acg	acg	1056	
Arg	Ala	Glu	Arg 340	Gln	Arg	Thr	Ile	Ile 345	Pro	Pro	Arg	Pro	Lys 350	Thr	Thr		
ggc	gag	tcc	gcg	ccg	ccg	ccc	acc	ggc	ggc	ttc	agc	gcc	acc	gac	ctg	1104	
Gly	Glu	Ser 355	Ala	Pro	Pro	Pro	Thr 360	Gly	Gly	Phe	Ser	Ala 365	Thr	Asp	Leu		
agc	gtc	ccg	gtg	ccg	acc	ccg	cgt	ccc	ggc	cag	gag	tcc	gct	ccc	ccc	1152	
Ser	Val 370	Pro	Val	Pro	Thr	Pro	Arg 375	Pro	Gly	Gln	Glu 380	Ser	Ala	Pro	Pro		
ggc	tcg	cgg	gcg	aac	tgg	ccg	ctg	gtc	aac	aac	ccc	gag	gac	ccc	gcc	1200	
Gly	Ser	Arg	Ala	Asn 390	Trp	Pro	Leu	Val	Asn 395	Asn	Pro	Glu	Asp	Pro	Ala 400		
gac	agc	tcc	ccg	aac	aat	ccc	gtc	gcg	cgg	cgg	ccc	ttg	gag	gat	cgg	1248	
Asp	Ser	Ser	Pro	Asn 405	Asn	Pro	Val	Ala	Arg 410	Arg	Pro	Leu	Glu	Asp 415	Arg		
gcg	aag	cgg	cag	atc	gac	gcg	ccg	acc	cag	gtg	gtc	ccg	ccg	gcc	gag	1296	
Ala	Lys	Arg	Gln 420	Ile	Asp	Ala	Pro	Thr 425	Gln	Val	Val	Pro	Pro	Ala	Glu		
ggc	cgg	gtc	acc	ccg	ccc	tgg	ctc	gcc	gac	gac	ctg	ccc	cag	gag	cca	1344	
Gly	Arg	Val 435	Thr	Pro	Pro	Trp	Leu 440	Ala	Asp	Asp	Leu	Pro 445	Gln	Glu	Pro		
ccg	atg	ctg	cgg	ctg	gtc	gag	ccg	cca	ccg	ctg	gcc	gac	cgg	gca	ctg	1392	
Pro	Met 450	Leu	Arg	Leu	Val	Glu 455	Pro	Pro	Pro	Leu	Ala 460	Asp	Arg	Ala	Leu		
cgg	gat	ggg	ccg	ggc	cag	gct	gcc	gac	ccg	cgc	ctg	gag	ccc	ccg	ccg	1440	
Arg	Asp	Gly	Pro	Gly 470	Gln	Ala	Ala	Asp	Pro	Arg	Leu 475	Glu	Pro	Pro	Pro 480		
ctg	cgg	ctg	gtc	gac	cgc	ggc	gag	gca	gcc	cgc	gcc	ggc	cgt	ccc	gcg	1488	
Leu	Arg	Leu	Val 485	Asp	Arg	Gly	Glu	Ala	Ala 490	Arg	Ala	Gly	Arg	Pro 495	Ala		
ccg	gag	ccc	cgc	ccc	gag	cgg	gcc	ccc	gcg	gaa	cac	cgg	tcc	ccg	ctg	1536	
Pro	Glu	Pro	Arg 500	Pro	Glu	Arg	Ala	Pro 505	Ala	Glu	His	Arg	Ser 510	Pro	Leu		
ggc	cag	cgg	gtc	ccg	ttg	gag	gag	cgg	ccc	gac	atg	gaa	cat	cgg	acc	1584	
Gly	Gln	Arg	Val 515	Pro	Leu	Glu	Glu 520	Arg	Pro	Asp	Met	Glu 525	His	Arg	Thr		
gcc	ccg	ccg	cag	ccg	tcg	cgg	tcc	gcg	ccg	atg	gag	cgg	cgt	acc	ccg	1632	
Ala	Pro	Pro	Gln	Pro	Ser	Arg 535	Ser	Ala	Pro	Met	Glu 540	Arg	Arg	Thr	Pro		
ccg	atc	tcc	gac	gag	ggg	gac	ggc	gac	ctg	ctg	atc	ttc	gcc	gcc	gcc	1680	
Pro	Ile	Ser	Asp	Glu 550	Gly	Asp	Gly	Asp	Leu 555	Leu	Ile	Phe	Ala	Ala	Ala 560		
aag	tcg	gcc	tgg	ttc	gtc	ggg	cac	ggc	gac	gag	tcc	gag	atg	gac	tgg	1728	
Lys	Ser	Ala	Trp 565	Phe	Val	Gly	His	Gly	Asp 570	Glu	Ser	Glu	Met	Asp 575	Trp		
tcg	agc	acc	gcc	gac	acc	ggg	tgg	cag	gcc	gcc	gag	cag	gcc	gcc	cgc	1776	
Ser	Ser	Thr	Ala	Asp	Thr	Gly	Trp	Gln	Ala	Ala	Glu	Gln	Ala	Ala	Arg		

580								585					590					
ccg	gcg	gtg	ggc	gcc	gat	acc	aag	gcc	ggg	ttg	ccc	aag	cgg	gtg	ccg	1824		
Pro	Ala	Val	Gly	Ala	Asp	Thr	Lys	Ala	Gly	Leu	Pro	Lys	Arg	Val	Pro			
		595					600					605						
cag	gcc	aac	ctg	gtt	ccg	ggc	tcc	ccc	ctg	cgc	gag	gag	cgt	ccc	cta	1872		
Gln	Ala	Asn	Leu	Val	Pro	Gly	Ser	Pro	Leu	Arg	Glu	Glu	Arg	Pro	Leu			
	610					615					620							
cgg	ata	gtc	cgc	gac	gcg	gcc	agc	ctc	gcc	gag	aac	acg	acc	ggc	tac	1920		
Arg	Ile	Val	Arg	Asp	Ala	Ala	Ser	Leu	Ala	Glu	Asn	Thr	Thr	Gly	Tyr			
625					630					635				640				
ttc	cgg	ggc	tgg	cgt	cgc	ggg	cag	gag	atc	ggc	ggg	ttc	gcc	gtc	ggc	1968		
Phe	Arg	Gly	Trp	Arg	Arg	Gly	Gln	Glu	Ile	Gly	Gly	Phe	Ala	Val	Gly			
				645					650					655				
ggc	cgg	ccg	ggc	cgc	gag	gcg	gcc	ggc	ggc	tgg	gac	ttc	acc	cgg	gac	2016		
Gly	Arg	Pro	Gly	Arg	Glu	Ala	Ala	Gly	Gly	Trp	Asp	Phe	Thr	Arg	Asp			
			660					665					670					
acc	ggc	gac	cga	gac	gac	gac	cgg	gag	tac	gag	tac	cgg	tcc	gcc	ggc	2064		
Thr	Gly	Asp	Arg	Asp	Asp	Asp	Arg	Glu	Tyr	Glu	Tyr	Arg	Ser	Ala	Gly			
		675					680					685						
tac	cgc	tcc													2073			
Tyr	Arg	Ser																
		690																

<210> 159

<211> 691

<212> PRT

<213> Micromonospora carbonacea

<220>

<223> evcI

<400> 159

Met	Gln	Ser	Ala	Pro	Ala	Glu	Arg	Arg	Ala	Val	Gly	Leu	Ala	Arg	Ala
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Leu	Gln	Ala	Gly	Ala	Leu	Ser	Ala	Val	Thr	Leu	Pro	Ala	Pro	Arg	Asp
		20						25					30		

Leu	Ala	Gly	Tyr	Lys	Gln	Val	Leu	Ser	Ala	His	Ala	Ala	Leu	Ala	Ser
		35					40					45			

Gly	Arg	His	Ser	Ala	Ala	Val	Ala	Leu	Arg	Glu	Val	Leu	Arg	Glu	Leu
	50					55					60				

Tyr	Pro	Ala	Ala	Leu	Arg	Ala	Tyr	Pro	Asp	Pro	Ala	Glu	Pro	Val	Ala
65					70					75					80

Leu	Ala	Val	Leu	Asp	Ala	Leu	Pro	Glu	Pro	Gly	Met	Leu	Gly	Gly	Thr
				85					90					95	

Ile	Ala	Arg	Gly	Arg	Glu	Val	Ser	Val	Ala	Ala	Asp	Ala	Ile	Ala	Ala
			100					105					110		

His	Leu	Ala	Ala	Asp	Gly	Val	Ala	Asp	Glu	Gly	Lys	Ile	Asn	Asp	Ala
		115					120					125			

Val	Thr	Ala	Leu	Arg	Val	Ala	Ile	Ala	Glu	Thr	Pro	Arg	Arg	Ala	Ala
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

130					135					140					
Val	Ser	Arg	Ala	Leu	Thr	Ser	Ala	Val	Ala	Glu	Thr	Val	Arg	Gln	Ala
145					150					155					160
Val	Ala	Ser	Val	Arg	Ala	Cys	Asp	Ala	Gly	Cys	Glu	Ala	Leu	Val	Gly
				165					170					175	
Ala	Leu	Asp	Ala	Arg	Val	Thr	Thr	Pro	Thr	Pro	Val	Pro	Gly	Arg	Arg
			180					185					190		
Ala	Ala	Ala	Arg	Arg	Gly	Glu	Pro	Val	Ala	Glu	Leu	Pro	Gly	Ala	Gly
		195					200					205			
Leu	Arg	Ala	Leu	Arg	Pro	Thr	Glu	Pro	Glu	Pro	Val	Pro	Gly	Arg	Arg
	210					215					220				
Ser	Arg	Pro	Glu	Pro	Val	Pro	Gly	Gly	Ser	Leu	Pro	Ala	Gln	Pro	Arg
225					230					235					240
Pro	Leu	Gly	Pro	Pro	Pro	Val	Ala	Pro	Glu	Pro	Val	Ala	Pro	Pro	Pro
				245					250					255	
Val	Ala	Pro	Arg	Pro	Ile	Thr	Pro	Ala	Ala	Ser	Ala	Thr	Pro	Pro	Val
			260					265					270		
Ser	Gly	Pro	Pro	Ser	Pro	Glu	Pro	Arg	Arg	Leu	Ile	Asp	Asn	Pro	Ala
		275					280					285			
Asn	Arg	Pro	Val	Ser	Ala	Pro	Pro	Pro	Pro	Pro	Pro	Gly	Ile	Thr	Pro
	290					295					300				
Ile	Ala	Pro	Ser	Gln	Arg	Glu	Arg	Gly	Ser	Val	Pro	Pro	Ala	Glu	Ala
305					310					315					320
Gly	Glu	Pro	Phe	Arg	Pro	Thr	Leu	Thr	Thr	Ala	Ala	Ile	Gln	Asn	Ala
				325					330					335	
Arg	Ala	Glu	Arg	Gln	Arg	Thr	Ile	Ile	Pro	Pro	Arg	Pro	Lys	Thr	Thr
			340					345					350		
Gly	Glu	Ser	Ala	Pro	Pro	Pro	Pro	Thr	Gly	Gly	Phe	Ser	Ala	Thr	Asp
		355						360					365		Leu
Ser	Val	Pro	Val	Pro	Thr	Pro	Arg	Pro	Gly	Gln	Glu	Ser	Ala	Pro	Pro
	370					375					380				
Gly	Ser	Arg	Ala	Asn	Trp	Pro	Leu	Val	Asn	Asn	Pro	Glu	Asp	Pro	Ala
385					390					395					400
Asp	Ser	Ser	Pro	Asn	Asn	Pro	Val	Ala	Arg	Arg	Pro	Leu	Glu	Asp	Arg
				405					410					415	
Ala	Lys	Arg	Gln	Ile	Asp	Ala	Pro	Thr	Gln	Val	Val	Pro	Pro	Ala	Glu
			420					425					430		
Gly	Arg	Val	Thr	Pro	Pro	Trp	Leu	Ala	Asp	Asp	Leu	Pro	Gln	Glu	Pro
		435					440					445			
Pro	Met	Leu	Arg	Leu	Val	Glu	Pro	Pro	Pro	Leu	Ala	Asp	Arg	Ala	Leu
	450					455					460				
Arg	Asp	Gly	Pro	Gly	Gln	Ala	Ala	Asp	Pro	Arg	Leu	Glu	Pro	Pro	Pro
465					470					475					480

Leu Arg Leu Val Asp Arg Gly Glu Ala Ala Arg Ala Gly Arg Pro Ala
 485 490 495
 Pro Glu Pro Arg Pro Glu Arg Ala Pro Ala Glu His Arg Ser Pro Leu
 500 505 510
 Gly Gln Arg Val Pro Leu Glu Glu Arg Pro Asp Met Glu His Arg Thr
 515 520 525
 Ala Pro Pro Gln Pro Ser Arg Ser Ala Pro Met Glu Arg Arg Thr Pro
 530 535 540
 Pro Ile Ser Asp Glu Gly Asp Gly Asp Leu Leu Ile Phe Ala Ala Ala
 545 550 555 560
 Lys Ser Ala Trp Phe Val Gly His Gly Asp Glu Ser Glu Met Asp Trp
 565 570 575
 Ser Ser Thr Ala Asp Thr Gly Trp Gln Ala Ala Glu Gln Ala Ala Arg
 580 585 590
 Pro Ala Val Gly Ala Asp Thr Lys Ala Gly Leu Pro Lys Arg Val Pro
 595 600 605
 Gln Ala Asn Leu Val Pro Gly Ser Pro Leu Arg Glu Glu Arg Pro Leu
 610 615 620
 Arg Ile Val Arg Asp Ala Ala Ser Leu Ala Glu Asn Thr Thr Gly Tyr
 625 630 635 640
 Phe Arg Gly Trp Arg Arg Gly Gln Glu Ile Gly Gly Phe Ala Val Gly
 645 650 655
 Gly Arg Pro Gly Arg Glu Ala Ala Gly Gly Trp Asp Phe Thr Arg Asp
 660 665 670
 Thr Gly Asp Arg Asp Asp Asp Arg Glu Tyr Glu Tyr Arg Ser Ala Gly
 675 680 685
 Tyr Arg Ser
 690

<210> 160
 <211> 591
 <212> DNA
 <213> Micromonospora carbonacea

<220>
 <221> CDS
 <222> (1)..(591)

<220>
 <223> evcJ

<400> 160
 atg tcg cac cgc ccg cct gtc ccg agc ggg cgc gtg acg tcg gcg aag 48
 Met Ser His Arg Pro Pro Val Pro Ser Gly Arg Val Thr Ser Ala Lys
 1 5 10 15
 atc gtt atc gcc ggt ggg ttc ggc gtc ggc aag acg acg ctg gtc ggc 96
 Ile Val Ile Ala Gly Gly Phe Gly Val Gly Lys Thr Thr Leu Val Gly
 20 25 30

tcg gtc tcg gag atc acg ccg ctg acc acc gag gcg atc atg acc tcc	144
Ser Val Ser Glu Ile Thr Pro Leu Thr Thr Glu Ala Ile Met Thr Ser	
35 40 45	
gcc ggc gtg ggc gtc gac gac acc cgg cag gtg ccg ggc gag acg acg	192
Ala Gly Val Gly Val Asp Asp Thr Arg Gln Val Pro Gly Glu Thr Thr	
50 55 60	
acc acg gtg gcg atg gac ttc ggc cgt atc tcg atc gac cgg gac ctg	240
Thr Thr Val Ala Met Asp Phe Gly Arg Ile Ser Ile Asp Arg Asp Leu	
65 70 75 80	
atc ctg tac ctg ttc ggc acc ccc ggc cag acc cgg ttc tgg ttc atg	288
Ile Leu Tyr Leu Phe Gly Thr Pro Gly Gln Thr Arg Phe Trp Phe Met	
85 90 95	
tgg gac gag ctg gtc cgg ggc gcc atc ggc gcg gtg gtc ctg gtc gac	336
Trp Asp Glu Leu Val Arg Gly Ala Ile Gly Ala Val Val Leu Val Asp	
100 105 110	
acc cgg cgg ctg gcc gac tgc ttc gcg gcc atc gac ttc ttc gag cat	384
Thr Arg Arg Leu Ala Asp Cys Phe Ala Ala Ile Asp Phe Phe Glu His	
115 120 125	
cgg cgg ctg ccg tac ctg gtg gcc atc aac tgc ttc gac ggg atg cag	432
Arg Arg Leu Pro Tyr Leu Val Ala Ile Asn Cys Phe Asp Gly Met Gln	
130 135 140	
tac cac gac ccg cag gac gtc cgg gac gcg ctc gcg atc tcg cac gac	480
Tyr His Asp Pro Gln Asp Val Arg Asp Ala Leu Ala Ile Ser His Asp	
145 150 155 160	
gtg ccg gtg gtg gcc tgc gac gcc cgg aac cgg gag tcg acg aag cac	528
Val Pro Val Val Ala Cys Asp Ala Arg Asn Arg Glu Ser Thr Lys His	
165 170 175	
gtg ctg atc tcg ctg gtc gag tac gtg ctc acg atg cgc cgc tcg cgc	576
Val Leu Ile Ser Leu Val Glu Tyr Val Leu Thr Met Arg Arg Ser Arg	
180 185 190	
gcg gtc gcg ccg gcc	591
Ala Val Ala Pro Ala	
195	

<210> 161

<211> 197

<212> PRT

<213> Micromonospora carbonacea

<220>

<223> evcJ

<400> 161

Met Ser His Arg Pro Pro Val Pro Ser Gly Arg Val Thr Ser Ala Lys
1 5 10 15

Ile Val Ile Ala Gly Gly Phe Gly Val Gly Lys Thr Thr Leu Val Gly
20 25 30

Ser Val Ser Glu Ile Thr Pro Leu Thr Thr Glu Ala Ile Met Thr Ser
35 40 45

Ala Gly Val Gly Val Asp Asp Thr Arg Gln Val Pro Gly Glu Thr Thr
50 55 60

Thr Thr Val Ala Met Asp Phe Gly Arg Ile Ser Ile Asp Arg Asp Leu
 65 70 75 80
 Ile Leu Tyr Leu Phe Gly Thr Pro Gly Gln Thr Arg Phe Trp Phe Met
 85 90 95
 Trp Asp Glu Leu Val Arg Gly Ala Ile Gly Ala Val Val Leu Val Asp
 100 105 110
 Thr Arg Arg Leu Ala Asp Cys Phe Ala Ala Ile Asp Phe Phe Glu His
 115 120 125
 Arg Arg Leu Pro Tyr Leu Val Ala Ile Asn Cys Phe Asp Gly Met Gln
 130 135 140
 Tyr His Asp Pro Gln Asp Val Arg Asp Ala Leu Ala Ile Ser His Asp
 145 150 155 160
 Val Pro Val Val Ala Cys Asp Ala Arg Asn Arg Glu Ser Thr Lys His
 165 170 175
 Val Leu Ile Ser Leu Val Glu Tyr Val Leu Thr Met Arg Arg Ser Arg
 180 185 190
 Ala Val Ala Pro Ala
 195

<210> 162
 <211> 402
 <212> DNA
 <213> Micromonospora carbonacea

<220>
 <221> CDS
 <222> (1)..(402)

<220>
 <223> evcJ2

<400> 162
 gtg tcg ggg acg aag gag gtg agc ggc gac atg gat cgt gac gag ccg 48
 Val Ser Gly Thr Lys Glu Val Ser Gly Asp Met Asp Arg Asp Glu Pro
 1 5 10 15
 act ggc gcg ttg gtc cgt ccg tac gcc gtc acc cgc ggt cgt acc cgc 96
 Thr Gly Ala Leu Val Arg Pro Tyr Ala Val Thr Arg Gly Arg Thr Arg
 20 25 30
 cct cgg ctg gac atc gcg ttg gag gcg ctc gtc gag acg acg gtg cgc 144
 Pro Arg Leu Asp Ile Ala Leu Glu Ala Leu Val Glu Thr Thr Val Arg
 35 40 45
 ggt cgg gcc gct gcc agt agc aac ggt ggc cag ggc cga gag cac cag 192
 Gly Arg Ala Ala Ala Ser Ser Asn Gly Gly Gln Gly Arg Glu His Gln
 50 55 60
 tac atc gcc gcg ctg tgc gac gga cgc gtg cag tcg ctt gcc gag atc 240
 Tyr Ile Ala Ala Leu Cys Asp Gly Arg Val Gln Ser Leu Ala Glu Ile
 65 70 75 80
 gcg gcg cgg atg cag ctc ccg ctc ggc gtg gct agg gtg ctc atc gcc 288
 Ala Ala Arg Met Gln Leu Pro Leu Gly Val Ala Arg Val Leu Ile Ala
 85 90 95

gac atg gcg acg gac ggc ctg gtc gca gtc cac gag ccg acc atc ctg 336
 Asp Met Ala Thr Asp Gly Leu Val Ala Val His Glu Pro Thr Ile Leu
 100 105 110

gac gac tcc gac gac gcg gtg ggc act gaa ctg ctg gag agg gtg ctg 384
 Asp Asp Ser Asp Asp Ala Val Gly Thr Glu Leu Leu Glu Arg Val Leu
 115 120 125

agt gga ctt cgc agg ctc 402
 Ser Gly Leu Arg Arg Leu
 130

<210> 163
 <211> 134
 <212> PRT
 <213> Micromonospora carbonacea

<220>
 <223> evcJ2

<400> 163
 Val Ser Gly Thr Lys Glu Val Ser Gly Asp Met Asp Arg Asp Glu Pro
 1 5 10 15
 Thr Gly Ala Leu Val Arg Pro Tyr Ala Val Thr Arg Gly Arg Thr Arg
 20 25 30
 Pro Arg Leu Asp Ile Ala Leu Glu Ala Leu Val Glu Thr Thr Val Arg
 35 40 45
 Gly Arg Ala Ala Ala Ser Ser Asn Gly Gly Gln Gly Arg Glu His Gln
 50 55 60
 Tyr Ile Ala Ala Leu Cys Asp Gly Arg Val Gln Ser Leu Ala Glu Ile
 65 70 75 80
 Ala Ala Arg Met Gln Leu Pro Leu Gly Val Ala Arg Val Leu Ile Ala
 85 90 95
 Asp Met Ala Thr Asp Gly Leu Val Ala Val His Glu Pro Thr Ile Leu
 100 105 110
 Asp Asp Ser Asp Asp Ala Val Gly Thr Glu Leu Leu Glu Arg Val Leu
 115 120 125
 Ser Gly Leu Arg Arg Leu
 130

<210> 164
 <211> 351
 <212> DNA
 <213> Micromonospora carbonacea

<220>
 <221> CDS
 <222> (1)..(351)

<220>
 <223> evcK

<400> 164

gtg ccc ggt gtc gcg cac gcg gtc gcc gtc tcc gcg gac ggt ctg ctc 48
Val Pro Gly Val Ala His Ala Val Ala Val Ser Ala Asp Gly Leu Leu
1 5 10 15

ctg gcg tcg tca cga gac ctt ccg cgt gac cgg gcc gac cag ctc gcc 96
Leu Ala Ser Ser Arg Asp Leu Pro Arg Asp Arg Ala Asp Gln Leu Ala
20 25 30

gcg atc gcg tcc ggg ctg gtc agc ctc acg cag gga gcg gca cgc tgc 144
Ala Ile Ala Ser Gly Leu Val Ser Leu Thr Gln Gly Ala Ala Arg Cys
35 40 45

ttc gag ggc ggt gcg gtg ctg cag acc gtg gtc gag atg gac aac ggc 192
Phe Glu Gly Gly Ala Val Leu Gln Thr Val Val Glu Met Asp Asn Gly
50 55 60

ttc ctg ttc ctg atg tcc atc tcg gac ggc tcg tcc ttc gcc gtg ctc 240
Phe Leu Phe Leu Met Ser Ile Ser Asp Gly Ser Ser Phe Ala Val Leu
65 70 75 80

gcc gcc cgt agc tgc gac gtc ggg cag gtc gga tac gag atg gcc ctc 288
Ala Ala Arg Ser Cys Asp Val Gly Gln Val Gly Tyr Glu Met Ala Leu
85 90 95

ctg gtc gac cgg gtg ggc gac gcg ttg acc ccg cag ccg cgt acg act 336
Leu Val Asp Arg Val Gly Asp Ala Leu Thr Pro Gln Pro Arg Thr Thr
100 105 110

gtg ggg atg atg ggc 351
Val Gly Met Met Gly
115

<210> 165

<211> 117

<212> PRT

<213> Micromonospora carbonacea

<220>

<223> evcK

<400> 165

Val Pro Gly Val Ala His Ala Val Ala Val Ser Ala Asp Gly Leu Leu
1 5 10 15

Leu Ala Ser Ser Arg Asp Leu Pro Arg Asp Arg Ala Asp Gln Leu Ala
20 25 30

Ala Ile Ala Ser Gly Leu Val Ser Leu Thr Gln Gly Ala Ala Arg Cys
35 40 45

Phe Glu Gly Gly Ala Val Leu Gln Thr Val Val Glu Met Asp Asn Gly
50 55 60

Phe Leu Phe Leu Met Ser Ile Ser Asp Gly Ser Ser Phe Ala Val Leu
65 70 75 80

Ala Ala Arg Ser Cys Asp Val Gly Gln Val Gly Tyr Glu Met Ala Leu
85 90 95

Leu Val Asp Arg Val Gly Asp Ala Leu Thr Pro Gln Pro Arg Thr Thr
100 105 110

Val Gly Met Met Gly
115

<210> 166
 <211> 3435
 <212> DNA
 <213> Micromonospora carbonacea

<220>
 <221> CDS
 <222> (1)..(3435)

<220>
 <223> evcL

<400> 166
 atg ccg atc tgg tcc aag ctc ggt ctc atc atg atc gtg ccg acc atc 48
 Met Pro Ile Trp Ser Lys Leu Gly Leu Ile Met Ile Val Pro Thr Ile
 1 5 10 15
 gcc acg gtc gtc gtc ggc acc agt ggc ctc gtg gac aac ctg gaa acg 96
 Ala Thr Val Val Val Gly Thr Ser Gly Leu Val Asp Asn Leu Glu Thr
 20 25 30
 ctg aac aac gcc aac cgc tcc ggc gac ctg gcc aat ctg gtg ggc tac 144
 Leu Asn Asn Ala Asn Arg Ser Gly Asp Leu Ala Asn Leu Val Gly Tyr
 35 40 45
 tcg ggc gac ctg gtc aac agc ctc cag gac gaa cgc acc tcc gcg gtg 192
 Ser Gly Asp Leu Val Asn Ser Leu Gln Asp Glu Arg Thr Ser Ala Val
 50 55 60
 ttg ctg ctc ggg gcg agc ggc gac cag gcc aag gcg cag tac cag gag 240
 Leu Leu Leu Gly Ala Ser Gly Asp Gln Ala Lys Ala Gln Tyr Gln Glu
 65 70 75 80
 gcg tac aac cgg gtc aac atc cgg gtc gac cag gac aag gtg ccg tac 288
 Ala Tyr Asn Arg Val Asn Ile Arg Val Asp Gln Asp Lys Val Pro Tyr
 85 90 95
 ctg caa cag cgg ggg gag gtc gac ggc ctg ccg agc agc ctg gag ggc 336
 Leu Gln Gln Arg Gly Glu Val Asp Gly Leu Pro Ser Ser Leu Glu Gly
 100 105 110
 ctc ctc gac ggg atc gac cag aac ctg aag gac ctc ccc ggc acc cgc 384
 Leu Leu Asp Gly Ile Asp Gln Asn Leu Lys Asp Leu Pro Gly Thr Arg
 115 120 125
 agc cag gtc ttc aac ggc aag ttg aag atc atc gac gcc atg cag gcg 432
 Ser Gln Val Phe Asn Gly Lys Leu Lys Ile Ile Asp Ala Met Gln Ala
 130 135 140
 tac gag ggc ctg atc aac gac ctg ctg tcc atc cgc gac tcc gcc acc 480
 Tyr Glu Gly Leu Ile Asn Asp Leu Leu Ser Ile Arg Asp Ser Ala Thr
 145 150 155 160
 cac ctc gcc ggt gac aac gac ctg agc gac cgg atg cgg gcc gcg gca 528
 His Leu Ala Gly Asp Asn Asp Leu Ser Asp Arg Met Arg Ala Ala Ala
 165 170 175
 gcc gtc gcc cgg gag aag gaa tac ctc tcg gtc cgc cgg gtc gtg gtg 576
 Ala Val Ala Arg Glu Lys Glu Tyr Leu Ser Val Arg Arg Val Val Val
 180 185 190
 cac cgg gcg ctg atc cag cgc gag ttg acc ccc atc ctg cgc acc gac 624

His	Arg	Ala	Leu	Ile	Gln	Arg	Glu	Leu	Thr	Pro	Ile	Leu	Arg	Thr	Asp	
		195					200					205				
tac	atc	gcc	agc	ggc	acc	ggc	cag	cag	cag	gca	ctg	caa	agc	ttc	aag	672
Tyr	Ile	Ala	Ser	Gly	Thr	Gly	Gln	Gln	Gln	Ala	Leu	Gln	Ser	Phe	Lys	
	210					215					220					
gcg	gtg	gcc	agc	ctg	gac	gag	tcg	gac	ctg	cac	gac	cag	acc	gtc	gcc	720
Ala	Val	Ala	Ser	Leu	Asp	Glu	Ser	Asp	Leu	His	Asp	Gln	Thr	Val	Ala	
225					230					235					240	
ggc	ggc	gac	cgg	cgc	gag	gcg	cag	aac	tac	acc	ggc	tgg	ctc	gac	ggc	768
Gly	Gly	Asp	Arg	Arg	Glu	Ala	Gln	Asn	Tyr	Thr	Gly	Trp	Leu	Asp	Gly	
				245					250					255		
aac	acc	aac	ggc	agc	atg	gcc	aac	gcg	ccg	ttc	ggg	ccg	gat	cag	tgg	816
Asn	Thr	Asn	Gly	Ser	Met	Ala	Asn	Ala	Pro	Phe	Gly	Pro	Asp	Gln	Trp	
			260					265					270			
gac	gcg	gcc	atg	gtc	gcc	agc	gcc	aaa	ctg	atc	cgt	acg	gtc	gag	gcg	864
Asp	Ala	Ala	Met	Val	Ala	Ser	Ala	Lys	Leu	Ile	Arg	Thr	Val	Glu	Ala	
		275					280					285				
aag	ctc	gac	ggc	aac	gtg	gtc	aag	cag	gcc	gac	gcg	ctc	cgc	tcc	gac	912
Lys	Leu	Asp	Gly	Asn	Val	Val	Lys	Gln	Ala	Asp	Ala	Leu	Arg	Ser	Asp	
	290					295					300					
gta	cag	cgc	acg	gtg	ttc	ctc	cag	acc	ggc	ctg	ctg	ctc	ggc	atg	ctg	960
Val	Gln	Arg	Thr	Val	Phe	Leu	Gln	Thr	Gly	Leu	Leu	Leu	Gly	Met	Leu	
305					310					315					320	
ctg	ctg	gcc	atc	ctg	ttc	gcg	tac	ctg	gtc	gcc	cgg	tcg	atg	gcc	cgc	1008
Leu	Leu	Ala	Ile	Leu	Phe	Ala	Tyr	Leu	Val	Ala	Arg	Ser	Met	Ala	Arg	
				325					330					335		
tcg	ctg	cgc	gac	ctg	cgc	cag	ggt	gcg	ctc	agc	atc	gcc	cag	tac	ggt	1056
Ser	Leu	Arg	Asp	Leu	Arg	Gln	Gly	Ala	Leu	Ser	Ile	Ala	Gln	Tyr	Gly	
			340					345					350			
ttg	ccc	cag	gcc	gtt	gcc	cgg	ctg	cgc	gat	ccg	cag	ttt	tcc	agc	cag	1104
Leu	Pro	Gln	Ala	Val	Ala	Arg	Leu	Arg	Asp	Pro	Gln	Phe	Ser	Ser	Gln	
		355					360					365				
ctc	tcc	ccg	gtg	cag	gcg	gcc	aac	cag	atc	gcc	gag	ccg	ctg	ccg	gtg	1152
Leu	Ser	Pro	Val	Gln	Ala	Ala	Asn	Gln	Ile	Ala	Glu	Pro	Leu	Pro	Val	
	370					375					380					
cgc	agc	aag	gac	gag	ttc	ggc	cag	gtg	acc	gag	gcg	ttc	aac	gcg	gtc	1200
Arg	Ser	Lys	Asp	Glu	Phe	Gly	Gln	Val	Thr	Glu	Ala	Phe	Asn	Ala	Val	
385					390					395					400	
cac	ctg	gag	gcc	gta	cgg	acg	gcg	gcg	gag	cag	gcc	gcg	ctg	cgc	gcc	1248
His	Leu	Glu	Ala	Val	Arg	Thr	Ala	Ala	Glu	Gln	Ala	Ala	Leu	Arg	Ala	
				405					410					415		
tcc	gtc	gcg	acc	atg	ttc	gtc	aac	ctg	gcc	cgc	cgt	tcg	cag	atc	ctg	1296
Ser	Val	Ala	Thr	Met	Phe	Val	Asn	Leu	Ala	Arg	Arg	Ser	Gln	Ile	Leu	
			420					425					430			
gtc	gac	cgg	ctg	atc	ggc	cac	ctc	gac	cgg	ctg	gag	cgc	ggc	gag	gag	1344
Val	Asp	Arg	Leu	Ile	Gly	His	Leu	Asp	Arg	Leu	Glu	Arg	Gly	Glu	Glu	
		435					440					445				
gac	ccg	gac	cgg	ctg	gcc	gag	ctg	ttc	cag	ctc	gac	cac	ctg	gcc	acc	1392
Asp	Pro	Asp	Arg	Leu	Ala	Glu	Leu	Phe	Gln	Leu	Asp	His	Leu	Ala	Thr	

450	455	460	
cgg atg cgc cgc aac gac gag aac ctg ctg gtg ctc gcc ggg gcc gac Arg Met Arg Arg Asn Asp Glu Asn Leu Leu Val Leu Ala Gly Ala Asp 465 470 475 480			1440
tcc acc cgc gtg cag cgc gag ccg gcg gca ctg atc gac gtg ctg cgg Ser Thr Arg Val Gln Arg Glu Pro Ala Ala Leu Ile Asp Val Leu Arg 485 490 495			1488
gcc gcc cag tcc gag gtc gag cac tac acc cgg atc gag ttc ggg gtg Ala Ala Gln Ser Glu Val Glu His Tyr Thr Arg Ile Glu Phe Gly Val 500 505 510			1536
atc gac cgt gac atc gag gtc gcc gcg cac gcg gtc aac gac ctg gtc Ile Asp Arg Asp Ile Glu Val Ala Ala His Ala Val Asn Asp Leu Val 515 520 525			1584
cac ctg gtc gcc gag ctg ttc gac aac gcg acc gcc ttc tcg ccg ccc His Leu Val Ala Glu Leu Phe Asp Asn Ala Thr Ala Phe Ser Pro Pro 530 535 540			1632
gac tcg cag gtg atg gtg gag gcc cgc cgg gtc ggc gac cgg gcc aac Asp Ser Gln Val Met Val Glu Ala Arg Arg Val Gly Asp Arg Ala Asn 545 550 555 560			1680
ctc tac gtc gag gac cgg ggc atc ggc atc agc gcc gag cag cta cac Leu Tyr Val Glu Asp Arg Gly Ile Gly Ile Ser Ala Glu Gln Leu His 565 570 575			1728
gac ctc aac gac cgc ctc gcc tcg ccg ccg cag gtg gac gtg gcc gtc Asp Leu Asn Asp Arg Leu Ala Ser Pro Pro Gln Val Asp Val Ala Val 580 585 590			1776
tcc cgg atg atg ggc ctg gtt gtg gtc gcc cgg ttg gcg tcc cgg cac Ser Arg Met Met Gly Leu Val Val Val Ala Arg Leu Ala Ser Arg His 595 600 605			1824
ggg gtc aag gtc gag ctg cgg ccc ggc acc gac cgg ggg acc gtc gcc Gly Val Lys Val Glu Leu Arg Pro Gly Thr Asp Arg Gly Thr Val Ala 610 615 620			1872
gac gtc acc ctg ccc acc acc gtg ctg gtg ccc cgg gcg ctc tcc ggc Asp Val Thr Leu Pro Thr Thr Val Leu Val Pro Arg Ala Leu Ser Gly 625 630 635 640			1920
cgg ttc cag cag ccc ggc gcg ctg ccg gcc cct ccc gcc tcg ctc acc Arg Phe Gln Gln Pro Gly Ala Leu Pro Ala Pro Pro Ala Ser Leu Thr 645 650 655			1968
agc tcg cag ccc ggc ggg gcc ccc ccg gcc ctg ggt gcc ttc gcg gcc Ser Ser Gln Pro Gly Gly Ala Pro Pro Ala Leu Gly Ala Phe Ala Ala 660 665 670			2016
ttc ggc aac aac ccg gcg aca ccg gcg ccc acc cag cgg ccg ggg cac Phe Gly Asn Asn Pro Ala Thr Pro Ala Pro Thr Gln Arg Pro Gly His 675 680 685			2064
tcg ggc aac cag gta acc ctg ggc ggc cgg tcg ttc gac ccg gcc tcg Ser Gly Asn Gln Val Thr Leu Gly Gly Arg Ser Phe Asp Pro Ala Ser 690 695 700			2112
cgc aac ggc cac ggc acg ccc gcg tcg acc ggt tcc atg cgg tcg atg Arg Asn Gly His Gly Thr Pro Ala Ser Thr Gly Ser Met Arg Ser Met 705 710 715 720			2160

ccg gcc tgg tcg gac ctg acc ggg gcc agt ggc acc gct ggc ggt gcc	2208
Pro Ala Trp Ser Asp Leu Thr Gly Ala Ser Gly Thr Ala Gly Gly Ala	
725 730 735	
gcc gcc ggc cgc acc tcg aat ggc cag tcg agc gac ccg ctg ccg cag	2256
Ala Ala Gly Arg Thr Ser Asn Gly Gln Ser Ser Asp Pro Leu Pro Gln	
740 745 750	
cgg cgg gcg tcc ggc gac ggc gat ccg gcc agc agc ggc cag cag ccg	2304
Arg Arg Ala Ser Gly Asp Gly Asp Pro Ala Ser Ser Gly Gln Gln Pro	
755 760 765	
gcc atc ccc cga cag ctg ccg agc agc ccg gag gcc ccg ggc tgg acc	2352
Ala Ile Pro Arg Gln Leu Pro Ser Ser Pro Glu Ala Arg Gly Trp Thr	
770 775 780	
ccg cca ccg gtc tcg gtg ccg ccg gtg tcc gca ccg ccg gtt tcc gtc	2400
Pro Pro Pro Val Ser Val Pro Pro Val Ser Ala Pro Pro Val Ser Val	
785 790 795 800	
ttc ccg gtc tcg ggt cag ccc gtc tcg gcc gcc ccg gtg tcc ggt cag	2448
Phe Pro Val Ser Gly Gln Pro Val Ser Ala Ala Pro Val Ser Gly Gln	
805 810 815	
ccg ttc ggc acg ccc gtc tcc ggt cag ccg ttc ggc acg ccc gtg tcc	2496
Pro Phe Gly Thr Pro Val Ser Gly Gln Pro Phe Gly Thr Pro Val Ser	
820 825 830	
ggt cag ccg tac tcg gcg cag ccg ctg ccc agt ccg ccg gtc ccg tcg	2544
Gly Gln Pro Tyr Ser Ala Gln Pro Leu Pro Ser Arg Pro Val Pro Ser	
835 840 845	
gcc cag gcg ccc gtg gcg ccg ccg gcc tgg ccg ccg gtg gcc gcg ccg	2592
Ala Gln Ala Pro Val Ala Pro Pro Ala Trp Pro Pro Val Ala Ala Pro	
850 855 860	
gag ccg gtc acc ccg ccg gtg ccg gag cgc ctc gcc gca gcc ctg gac	2640
Glu Pro Val Thr Pro Pro Val Pro Glu Arg Leu Ala Ala Ala Leu Asp	
865 870 875 880	
atg acc acg gag ctg ccc ccg gtg ccg agc acc gag gtg ccg agc acg	2688
Met Thr Thr Glu Leu Pro Arg Val Pro Ser Thr Glu Val Pro Ser Thr	
885 890 895	
ccg gcc acc cag ccg acg acc ccg ccc acg ccg gcg ccg tcg acg ccc	2736
Pro Ala Thr Gln Pro Thr Thr Pro Pro Thr Pro Ala Arg Ser Thr Pro	
900 905 910	
gtg cag gcc cag aac ccg cag cag ccg tac gcg gac gag acg atg gag	2784
Val Gln Ala Gln Asn Arg Gln Gln Arg Tyr Ala Asp Glu Thr Met Glu	
915 920 925	
ctg ccg atc ttc ccg gag ctc gag tcg gcc tgg ttc cgt acc cgc cgc	2832
Leu Pro Ile Phe Arg Glu Leu Glu Ser Ala Trp Phe Arg Thr Arg Arg	
930 935 940	
tcg ggt tcg gag gag acg gcc ggc gtc gcc cag cgc gcg acc aat ggc	2880
Ser Gly Ser Glu Glu Thr Ala Gly Val Ala Gln Arg Ala Thr Asn Gly	
945 950 955 960	
gcc ggg agc ccg gcg aac gcc gcc gtg acc caa cag ttc tcc gcg gtc	2928
Ala Gly Ser Pro Ala Asn Ala Ala Val Thr Gln Gln Phe Ser Ala Val	
965 970 975	

gac gtc acc ggc cgg ccc gtc cag aca cca gca ccc ggg acg aca ggt 2976
 Asp Val Thr Gly Arg Pro Val Gln Thr Pro Ala Pro Gly Thr Thr Gly
 980 985 990

aac gca ccg atg gca gac acc ccg atg gcc gga gga atg ccg cgc gac 3024
 Asn Ala Pro Met Ala Asp Thr Pro Met Ala Gly Gly Met Pro Arg Asp
 995 1000 1005

aac ggg tcg ccg acc aac ggt ggc acc cgc ccc ggt ccc gcc gag ggc 3072
 Asn Gly Ser Pro Thr Asn Gly Gly Thr Arg Pro Gly Pro Ala Glu Gly
 1010 1015 1020

ttc gcc ggc cgg cgg ccc acg ccg cag gcc cac gcc tgg cag act gcc 3120
 Phe Ala Gly Arg Arg Pro Thr Pro Gln Ala His Ala Trp Gln Thr Ala
 1025 1030 1035 1040

gcg gac gac ggc tgg cgg gcc gcc tcg gcg gcc acc gag gtc ccg gtg 3168
 Ala Asp Asp Gly Trp Arg Ala Ala Ser Ala Ala Thr Glu Val Pro Val
 1045 1050 1055

gcg gag acc acc cgc aag ggc ctg ccg aag cgg gtg ccg atg gcc caa 3216
 Ala Glu Thr Thr Arg Lys Gly Leu Pro Lys Arg Val Pro Met Ala Gln
 1060 1065 1070

ctc gtg cct ggc ggg gtg gag aag ccc acc acg tcg gtc cag cgc cgt 3264
 Leu Val Pro Gly Gly Val Glu Lys Pro Thr Thr Ser Val Gln Arg Arg
 1075 1080 1085

acg ccg gag ggc gtc cgc ggt ctg ctc tcg gca tac cat cga ggc gtg 3312
 Thr Pro Glu Gly Val Arg Gly Leu Leu Ser Ala Tyr His Arg Gly Val
 1090 1095 1100

cag cgt ggg cgt acc gag ccc gac ggc aac ccg acc aac ccg gag gca 3360
 Gln Arg Gly Arg Thr Glu Pro Asp Gly Asn Pro Thr Asn Pro Glu Ala
 1105 1110 1115 1120

gct ccg ggt ggg cag caa tcc tcg cag tct ggc tca ggc ccg gtg gcc 3408
 Ala Pro Gly Gly Gln Gln Ser Ser Gln Ser Gly Ser Gly Pro Val Ala
 1125 1130 1135

ggg agc ggg cag aag gag caa caa gga 3435
 Gly Ser Gly Gln Lys Glu Gln Gln Gly
 1140 1145

<210> 167

<211> 1145

<212> PRT

<213> Micromonospora carbonacea

<220>

<223> evcL

<400> 167

Met Pro Ile Trp Ser Lys Leu Gly Leu Ile Met Ile Val Pro Thr Ile
1 5 10 15

Ala Thr Val Val Val Gly Thr Ser Gly Leu Val Asp Asn Leu Glu Thr
20 25 30

Leu Asn Asn Ala Asn Arg Ser Gly Asp Leu Ala Asn Leu Val Gly Tyr
35 40 45

Ser Gly Asp Leu Val Asn Ser Leu Gln Asp Glu Arg Thr Ser Ala Val
50 55 60

Leu	Leu	Leu	Gly	Ala	Ser	Gly	Asp	Gln	Ala	Lys	Ala	Gln	Tyr	Gln	Glu	65	70	75	80
Ala	Tyr	Asn	Arg	Val	Asn	Ile	Arg	Val	Asp	Gln	Asp	Lys	Val	Pro	Tyr	85	90	95	
Leu	Gln	Gln	Arg	Gly	Glu	Val	Asp	Gly	Leu	Pro	Ser	Ser	Leu	Glu	Gly	100	105	110	
Leu	Leu	Asp	Gly	Ile	Asp	Gln	Asn	Leu	Lys	Asp	Leu	Pro	Gly	Thr	Arg	115	120	125	
Ser	Gln	Val	Phe	Asn	Gly	Lys	Leu	Lys	Ile	Ile	Asp	Ala	Met	Gln	Ala	130	135	140	
Tyr	Glu	Gly	Leu	Ile	Asn	Asp	Leu	Leu	Ser	Ile	Arg	Asp	Ser	Ala	Thr	145	150	155	160
His	Leu	Ala	Gly	Asp	Asn	Asp	Leu	Ser	Asp	Arg	Met	Arg	Ala	Ala	Ala	165	170	175	
Ala	Val	Ala	Arg	Glu	Lys	Glu	Tyr	Leu	Ser	Val	Arg	Arg	Val	Val	Val	180	185	190	
His	Arg	Ala	Leu	Ile	Gln	Arg	Glu	Leu	Thr	Pro	Ile	Leu	Arg	Thr	Asp	195	200	205	
Tyr	Ile	Ala	Ser	Gly	Thr	Gly	Gln	Gln	Gln	Ala	Leu	Gln	Ser	Phe	Lys	210	215	220	
Ala	Val	Ala	Ser	Leu	Asp	Glu	Ser	Asp	Leu	His	Asp	Gln	Thr	Val	Ala	225	230	235	240
Gly	Gly	Asp	Arg	Arg	Glu	Ala	Gln	Asn	Tyr	Thr	Gly	Trp	Leu	Asp	Gly	245	250	255	
Asn	Thr	Asn	Gly	Ser	Met	Ala	Asn	Ala	Pro	Phe	Gly	Pro	Asp	Gln	Trp	260	265	270	
Asp	Ala	Ala	Met	Val	Ala	Ser	Ala	Lys	Leu	Ile	Arg	Thr	Val	Glu	Ala	275	280	285	
Lys	Leu	Asp	Gly	Asn	Val	Val	Lys	Gln	Ala	Asp	Ala	Leu	Arg	Ser	Asp	290	295	300	
Val	Gln	Arg	Thr	Val	Phe	Leu	Gln	Thr	Gly	Leu	Leu	Leu	Gly	Met	Leu	305	310	315	320
Leu	Leu	Ala	Ile	Leu	Phe	Ala	Tyr	Leu	Val	Ala	Arg	Ser	Met	Ala	Arg	325	330	335	
Ser	Leu	Arg	Asp	Leu	Arg	Gln	Gly	Ala	Leu	Ser	Ile	Ala	Gln	Tyr	Gly	340	345	350	
Leu	Pro	Gln	Ala	Val	Ala	Arg	Leu	Arg	Asp	Pro	Gln	Phe	Ser	Ser	Gln	355	360	365	
Leu	Ser	Pro	Val	Gln	Ala	Ala	Asn	Gln	Ile	Ala	Glu	Pro	Leu	Pro	Val	370	375	380	
Arg	Ser	Lys	Asp	Glu	Phe	Gly	Gln	Val	Thr	Glu	Ala	Phe	Asn	Ala	Val	385	390	395	400
His	Leu	Glu	Ala	Val	Arg	Thr	Ala	Ala	Glu	Gln	Ala	Ala	Leu	Arg	Ala				

405										410					415				
Ser	Val	Ala	Thr	Met	Phe	Val	Asn	Leu	Ala	Arg	Arg	Ser	Gln	Ile	Leu				
			420					425					430						
Val	Asp	Arg	Leu	Ile	Gly	His	Leu	Asp	Arg	Leu	Glu	Arg	Gly	Glu	Glu				
		435					440					445							
Asp	Pro	Asp	Arg	Leu	Ala	Glu	Leu	Phe	Gln	Leu	Asp	His	Leu	Ala	Thr				
	450					455					460								
Arg	Met	Arg	Arg	Asn	Asp	Glu	Asn	Leu	Leu	Val	Leu	Ala	Gly	Ala	Asp				
465					470					475					480				
Ser	Thr	Arg	Val	Gln	Arg	Glu	Pro	Ala	Ala	Leu	Ile	Asp	Val	Leu	Arg				
				485					490					495					
Ala	Ala	Gln	Ser	Glu	Val	Glu	His	Tyr	Thr	Arg	Ile	Glu	Phe	Gly	Val				
			500					505					510						
Ile	Asp	Arg	Asp	Ile	Glu	Val	Ala	Ala	His	Ala	Val	Asn	Asp	Leu	Val				
	515						520					525							
His	Leu	Val	Ala	Glu	Leu	Phe	Asp	Asn	Ala	Thr	Ala	Phe	Ser	Pro	Pro				
530						535					540								
Asp	Ser	Gln	Val	Met	Val	Glu	Ala	Arg	Arg	Val	Gly	Asp	Arg	Ala	Asn				
545					550					555					560				
Leu	Tyr	Val	Glu	Asp	Arg	Gly	Ile	Gly	Ile	Ser	Ala	Glu	Gln	Leu	His				
				565					570					575					
Asp	Leu	Asn	Asp	Arg	Leu	Ala	Ser	Pro	Pro	Gln	Val	Asp	Val	Ala	Val				
			580					585					590						
Ser	Arg	Met	Met	Gly	Leu	Val	Val	Val	Ala	Arg	Leu	Ala	Ser	Arg	His				
		595					600					605							
Gly	Val	Lys	Val	Glu	Leu	Arg	Pro	Gly	Thr	Asp	Arg	Gly	Thr	Val	Ala				
610						615					620								
Asp	Val	Thr	Leu	Pro	Thr	Thr	Val	Leu	Val	Pro	Arg	Ala	Leu	Ser	Gly				
625					630					635					640				
Arg	Phe	Gln	Gln	Pro	Gly	Ala	Leu	Pro	Ala	Pro	Pro	Ala	Ser	Leu	Thr				
				645					650					655					
Ser	Ser	Gln	Pro	Gly	Gly	Ala	Pro	Pro	Ala	Leu	Gly	Ala	Phe	Ala	Ala				
			660					665					670						
Phe	Gly	Asn	Asn	Pro	Ala	Thr	Pro	Ala	Pro	Thr	Gln	Arg	Pro	Gly	His				
	675						680					685							
Ser	Gly	Asn	Gln	Val	Thr	Leu	Gly	Gly	Arg	Ser	Phe	Asp	Pro	Ala	Ser				
	690					695					700								
Arg	Asn	Gly	His	Gly	Thr	Pro	Ala	Ser	Thr	Gly	Ser	Met	Arg	Ser	Met				
705					710					715					720				
Pro	Ala	Trp	Ser	Asp	Leu	Thr	Gly	Ala	Ser	Gly	Thr	Ala	Gly	Gly	Ala				
				725					730					735					
Ala	Ala	Gly	Arg	Thr	Ser	Asn	Gly	Gln	Ser	Ser	Asp	Pro	Leu	Pro	Gln				
			740					745					750						

Arg	Arg	Ala	Ser	Gly	Asp	Gly	Asp	Pro	Ala	Ser	Ser	Gly	Gln	Gln	Pro	755	760	765
Ala	Ile	Pro	Arg	Gln	Leu	Pro	Ser	Ser	Pro	Glu	Ala	Arg	Gly	Trp	Thr	770	775	780
Pro	Pro	Pro	Val	Ser	Val	Pro	Pro	Val	Ser	Ala	Pro	Pro	Val	Ser	Val	785	790	795
Phe	Pro	Val	Ser	Gly	Gln	Pro	Val	Ser	Ala	Ala	Pro	Val	Ser	Gly	Gln	805	810	815
Pro	Phe	Gly	Thr	Pro	Val	Ser	Gly	Gln	Pro	Phe	Gly	Thr	Pro	Val	Ser	820	825	830
Gly	Gln	Pro	Tyr	Ser	Ala	Gln	Pro	Leu	Pro	Ser	Arg	Pro	Val	Pro	Ser	835	840	845
Ala	Gln	Ala	Pro	Val	Ala	Pro	Pro	Ala	Trp	Pro	Pro	Val	Ala	Ala	Pro	850	855	860
Glu	Pro	Val	Thr	Pro	Pro	Val	Pro	Glu	Arg	Leu	Ala	Ala	Ala	Leu	Asp	865	870	875
Met	Thr	Thr	Glu	Leu	Pro	Arg	Val	Pro	Ser	Thr	Glu	Val	Pro	Ser	Thr	885	890	895
Pro	Ala	Thr	Gln	Pro	Thr	Thr	Pro	Pro	Thr	Pro	Ala	Arg	Ser	Thr	Pro	900	905	910
Val	Gln	Ala	Gln	Asn	Arg	Gln	Gln	Arg	Tyr	Ala	Asp	Glu	Thr	Met	Glu	915	920	925
Leu	Pro	Ile	Phe	Arg	Glu	Leu	Glu	Ser	Ala	Trp	Phe	Arg	Thr	Arg	Arg	930	935	940
Ser	Gly	Ser	Glu	Glu	Thr	Ala	Gly	Val	Ala	Gln	Arg	Ala	Thr	Asn	Gly	945	950	955
Ala	Gly	Ser	Pro	Ala	Asn	Ala	Ala	Val	Thr	Gln	Gln	Phe	Ser	Ala	Val	965	970	975
Asp	Val	Thr	Gly	Arg	Pro	Val	Gln	Thr	Pro	Ala	Pro	Gly	Thr	Thr	Gly	980	985	990
Asn	Ala	Pro	Met	Ala	Asp	Thr	Pro	Met	Ala	Gly	Gly	Met	Pro	Arg	Asp	995	1000	1005
Asn	Gly	Ser	Pro	Thr	Asn	Gly	Gly	Thr	Arg	Pro	Gly	Pro	Ala	Glu	Gly	1010	1015	1020
Phe	Ala	Gly	Arg	Arg	Pro	Thr	Pro	Gln	Ala	His	Ala	Trp	Gln	Thr	Ala	1025	1030	1035
Ala	Asp	Asp	Gly	Trp	Arg	Ala	Ala	Ser	Ala	Ala	Thr	Glu	Val	Pro	Val	1045	1050	1055
Ala	Glu	Thr	Thr	Arg	Lys	Gly	Leu	Pro	Lys	Arg	Val	Pro	Met	Ala	Gln	1060	1065	1070
Leu	Val	Pro	Gly	Gly	Val	Glu	Lys	Pro	Thr	Thr	Ser	Val	Gln	Arg	Arg	1075	1080	1085
Thr	Pro	Glu	Gly	Val	Arg	Gly	Leu	Leu	Ser	Ala	Tyr	His	Arg	Gly	Val	1090	1095	1100

Gln Arg Gly Arg Thr Glu Pro Asp Gly Asn Pro Thr Asn Pro Glu Ala
 1105 1110 1115 1120

Ala Pro Gly Gly Gln Gln Ser Ser Gln Ser Gly Ser Gly Pro Val Ala
 1125 1130 1135

Gly Ser Gly Gln Lys Glu Gln Gln Gly
 1140 1145

<210> 168

<211> 603

<212> DNA

<213> Micromonospora carbonacea

<220>

<221> CDS

<222> (1)..(603)

<220>

<223> evcM

<400> 168

atg gat cac ccc cac cgc ctc gtc ctg ctc gcc ggc cct tcg ggc tcc 48
 Met Asp His Pro His Arg Leu Val Leu Leu Ala Gly Pro Ser Gly Ser
 1 5 10 15

gga aag tcg tac ata gcc caa caa acc ggg ctt cct gtt ctt tgt ctg 96
 Gly Lys Ser Tyr Ile Ala Gln Gln Thr Gly Leu Pro Val Leu Cys Leu
 20 25 30

gac gac ttc tac aag gat ggt gat gac cct acg tta ccg cgc caa aac 144
 Asp Asp Phe Tyr Lys Asp Gly Asp Asp Pro Thr Leu Pro Arg Gln Asn
 35 40 45

ggt ctt gtg gac tgg gac tca ccc cag tcg tgg gac gcc ggg gcg gcc 192
 Gly Leu Val Asp Trp Asp Ser Pro Gln Ser Trp Asp Ala Gly Ala Ala
 50 55 60

gtg gaa acg att gcc cgg ctg gcg cgg gac ggc aag gcc gaa gtg ccg 240
 Val Glu Thr Ile Ala Arg Leu Ala Arg Asp Gly Lys Ala Glu Val Pro
 65 70 75 80

gtt tat gcg atc ggc gcg gac cgg cgg gtg gcc acc cgg aca ttc gag 288
 Val Tyr Ala Ile Gly Ala Asp Arg Arg Val Ala Thr Arg Thr Phe Glu
 85 90 95

gtc gcc gga tcg cca ctt ttc gtc gcc gaa ggg att ttc gcc gcc gag 336
 Val Ala Gly Ser Pro Leu Phe Val Ala Glu Gly Ile Phe Ala Ala Glu
 100 105 110

atc gtc gag gaa tgc cga cgg cga ggg ctg ctc gcc ggg gcg tac gcg 384
 Ile Val Glu Glu Cys Arg Arg Arg Gly Leu Leu Ala Gly Ala Tyr Ala
 115 120 125

ctg cgc cgg ccg cgc ggc acc acc ttt ttc cgg cgg ctc gcc cgc gac 432
 Leu Arg Arg Pro Arg Gly Thr Thr Phe Phe Arg Arg Leu Ala Arg Asp
 130 135 140

ctg gcc gag cag cgc aag gct ccc ggg atg ctg ctg cgg cgc ggc ctg 480
 Leu Ala Glu Gln Arg Lys Ala Pro Gly Met Leu Leu Arg Arg Gly Leu
 145 150 155 160

gcc ctg ctg cgc gcg gag ccg gcg gtg ctg cgc cgc cag gcg ggg ctc 528
 Ala Leu Leu Arg Ala Glu Pro Ala Val Leu Arg Arg Gln Ala Gly Leu
 165 170 175

ggc gct cac ccg gcc ccg gcc cgc gag gtg ctg cgc cgg gtg gcc gac 576
 Gly Ala His Pro Ala Pro Ala Arg Glu Val Leu Arg Arg Val Ala Asp
 180 185 190

ctg ctc gcc ggc cac ccg cac cac ccc 603
 Leu Leu Ala Gly His Pro His His Pro
 195 200

<210> 169

<211> 201

<212> PRT

<213> Micromonospora carbonacea

<220>

<223> evcM

<400> 169

Met Asp His Pro His Arg Leu Val Leu Leu Ala Gly Pro Ser Gly Ser
 1 5 10 15

Gly Lys Ser Tyr Ile Ala Gln Gln Thr Gly Leu Pro Val Leu Cys Leu
 20 25 30

Asp Asp Phe Tyr Lys Asp Gly Asp Asp Pro Thr Leu Pro Arg Gln Asn
 35 40 45

Gly Leu Val Asp Trp Asp Ser Pro Gln Ser Trp Asp Ala Gly Ala Ala
 50 55 60

Val Glu Thr Ile Ala Arg Leu Ala Arg Asp Gly Lys Ala Glu Val Pro
 65 70 75 80

Val Tyr Ala Ile Gly Ala Asp Arg Arg Val Ala Thr Arg Thr Phe Glu
 85 90 95

Val Ala Gly Ser Pro Leu Phe Val Ala Glu Gly Ile Phe Ala Ala Glu
 100 105 110

Ile Val Glu Glu Cys Arg Arg Arg Gly Leu Leu Ala Gly Ala Tyr Ala
 115 120 125

Leu Arg Arg Pro Arg Gly Thr Thr Phe Phe Arg Arg Leu Ala Arg Asp
 130 135 140

Leu Ala Glu Gln Arg Lys Ala Pro Gly Met Leu Leu Arg Arg Gly Leu
 145 150 155 160

Ala Leu Leu Arg Ala Glu Pro Ala Val Leu Arg Arg Gln Ala Gly Leu
 165 170 175

Gly Ala His Pro Ala Pro Ala Arg Glu Val Leu Arg Arg Val Ala Asp
 180 185 190

Leu Leu Ala Gly His Pro His His Pro
 195 200

<210> 170

<211> 1074

<212> DNA

<213> Micromonospora carbonacea

<220>

<221> CDS

<222> (1)..(1074)

<220>

<223> evcN

<400> 170

atg gtc gca atc tca tac gag gac atc gtc aag gtc ccc aag gcg ctg	48
Met Val Ala Ile Ser Tyr Glu Asp Ile Val Lys Val Pro Lys Ala Leu	
1 5 10 15	
ctg cac gac cac ctc gac ggc ggc ctg cgg ccg gcg acg atc gtc gag	96
Leu His Asp His Leu Asp Gly Gly Leu Arg Pro Ala Thr Ile Val Glu	
20 25 30	
ctg gcc gcc gag gtc ggc cac gag ctg ccc acc acc gac ccg gaa gcg	144
Leu Ala Ala Glu Val Gly His Glu Leu Pro Thr Thr Asp Pro Glu Ala	
35 40 45	
ctc ggc cgc tgg ttc gtc gcg gcg gcg aac tcc ggc tcg ctg gag cgc	192
Leu Gly Arg Trp Phe Val Ala Ala Ala Asn Ser Gly Ser Leu Glu Arg	
50 55 60	
tac ctg gag acg ttc gcc cac acc gtg gcg gtc atg cag acc gcg ccc	240
Tyr Leu Glu Thr Phe Ala His Thr Val Ala Val Met Gln Thr Ala Pro	
65 70 75 80	
gca ctg cgg cgg gtg gcc cag gag tgc gcg ctg gac ctg gcc gcc gac	288
Ala Leu Arg Arg Val Ala Gln Glu Cys Ala Leu Asp Leu Ala Ala Asp	
85 90 95	
ggg gtc gtc tac gcc gag gtg cgg ttc gcc ccc gag cag cac ctg gag	336
Gly Val Val Tyr Ala Glu Val Arg Phe Ala Pro Glu Gln His Leu Glu	
100 105 110	
cgg gac ctg acc ctg gac gag gtg gtc gag gcg gtc gtc gcc ggg ttc	384
Arg Asp Leu Thr Leu Asp Glu Val Val Glu Ala Val Val Ala Gly Phe	
115 120 125	
gcc gag ggc gcg gcg ctc gcc gcc gac gcc ggc cat ccg atc cgg gtc	432
Ala Glu Gly Ala Ala Leu Ala Ala Asp Ala Gly His Pro Ile Arg Val	
130 135 140	
ggc acc ctg ctc acc gcc atg cgg cac gcc gcc cgg tcg cag gag atc	480
Gly Thr Leu Leu Thr Ala Met Arg His Ala Ala Arg Ser Gln Glu Ile	
145 150 155 160	
gcc gaa ctg gcg gtg cgg cac cgc gac gcc ggc gtg gtg ggc ttc gac	528
Ala Glu Leu Ala Val Arg His Arg Asp Ala Gly Val Val Gly Phe Asp	
165 170 175	
atc gcc ggg gcg gag gcg gga ttc ccg ccc acc cgg cac ctg gac gcc	576
Ile Ala Gly Ala Glu Ala Gly Phe Pro Pro Thr Arg His Leu Asp Ala	
180 185 190	
ttc gag tac ctg cag cgg gag aac ttc cac ttc acc att cac gcc ggc	624
Phe Glu Tyr Leu Gln Arg Glu Asn Phe His Phe Thr Ile His Ala Gly	
195 200 205	
gag gcg ttc ggg ctg ccg tcg atc tgg cag gcc atc cag tgg tgc ggc	672
Glu Ala Phe Gly Leu Pro Ser Ile Trp Gln Ala Ile Gln Trp Cys Gly	

210	215	220	
gcg gac cgc ctc ggc cac ggg gtg cgc atc gtg gac gac atc acc ccc Ala Asp Arg Leu Gly His Gly Val Arg Ile Val Asp Asp Ile Thr Pro 225 230 235 240			720
ggc gac ccg ccc gtg ctg ggc cgg ctg gcc gcg tac gtg cgg gac aag Gly Asp Pro Pro Val Leu Gly Arg Leu Ala Ala Tyr Val Arg Asp Lys 245 250 255			768
cgg atc ccg ctg gag ctg tgc ccg tcc tcc aac gtg cag acc ggc gcg Arg Ile Pro Leu Glu Leu Cys Pro Ser Ser Asn Val Gln Thr Gly Ala 260 265 270			816
gcg gcg tcc atc gcc gag cac ccg atc ggg ctt ctg cgc gat ctg cgg Ala Ala Ser Ile Ala Glu His Pro Ile Gly Leu Leu Arg Asp Leu Arg 275 280 285			864
ttc cgg gtg acg gtg aac acc gac aac cgg ctg atg agc ggc acc tcc Phe Arg Val Thr Val Asn Thr Asp Asn Arg Leu Met Ser Gly Thr Ser 290 295 300			912
atg tcc cgg gag atg gcg ctg ctg gcg gag gcc ttc ggc tac ggc tgg Met Ser Arg Glu Met Ala Leu Leu Ala Glu Ala Phe Gly Tyr Gly Trp 305 310 315 320			960
aag gag ctc caa tgg ttc acc atc aac gcg atg aag agc gcg ttc atc Lys Glu Leu Gln Trp Phe Thr Ile Asn Ala Met Lys Ser Ala Phe Ile 325 330 335			1008
ccg ttc gac gag cgg ctg gcc atc atc gac gag gtg atc aag ccg gcg Pro Phe Asp Glu Arg Leu Ala Ile Ile Asp Glu Val Ile Lys Pro Ala 340 345 350			1056
tac ggg aag ctg ctg ggc Tyr Gly Lys Leu Leu Gly 355			1074

<210> 171
 <211> 358
 <212> PRT
 <213> Micromonospora carbonacea

<220>
 <223> evcN

<400> 171
 Met Val Ala Ile Ser Tyr Glu Asp Ile Val Lys Val Pro Lys Ala Leu
 1 5 10 15
 Leu His Asp His Leu Asp Gly Gly Leu Arg Pro Ala Thr Ile Val Glu
 20 25 30
 Leu Ala Ala Glu Val Gly His Glu Leu Pro Thr Thr Asp Pro Glu Ala
 35 40 45
 Leu Gly Arg Trp Phe Val Ala Ala Ala Asn Ser Gly Ser Leu Glu Arg
 50 55 60
 Tyr Leu Glu Thr Phe Ala His Thr Val Ala Val Met Gln Thr Ala Pro
 65 70 75 80
 Ala Leu Arg Arg Val Ala Gln Glu Cys Ala Leu Asp Leu Ala Ala Asp
 85 90 95

Gly Val Val Tyr Ala Glu Val Arg Phe Ala Pro Glu Gln His Leu Glu
 100 105 110
 Arg Asp Leu Thr Leu Asp Glu Val Val Glu Ala Val Val Ala Gly Phe
 115 120 125
 Ala Glu Gly Ala Ala Leu Ala Ala Asp Ala Gly His Pro Ile Arg Val
 130 135 140
 Gly Thr Leu Leu Thr Ala Met Arg His Ala Ala Arg Ser Gln Glu Ile
 145 150 155 160
 Ala Glu Leu Ala Val Arg His Arg Asp Ala Gly Val Val Gly Phe Asp
 165 170 175
 Ile Ala Gly Ala Glu Ala Gly Phe Pro Pro Thr Arg His Leu Asp Ala
 180 185 190
 Phe Glu Tyr Leu Gln Arg Glu Asn Phe His Phe Thr Ile His Ala Gly
 195 200 205
 Glu Ala Phe Gly Leu Pro Ser Ile Trp Gln Ala Ile Gln Trp Cys Gly
 210 215 220
 Ala Asp Arg Leu Gly His Gly Val Arg Ile Val Asp Asp Ile Thr Pro
 225 230 235 240
 Gly Asp Pro Pro Val Leu Gly Arg Leu Ala Ala Tyr Val Arg Asp Lys
 245 250 255
 Arg Ile Pro Leu Glu Leu Cys Pro Ser Ser Asn Val Gln Thr Gly Ala
 260 265 270
 Ala Ala Ser Ile Ala Glu His Pro Ile Gly Leu Leu Arg Asp Leu Arg
 275 280 285
 Phe Arg Val Thr Val Asn Thr Asp Asn Arg Leu Met Ser Gly Thr Ser
 290 295 300
 Met Ser Arg Glu Met Ala Leu Leu Ala Glu Ala Phe Gly Tyr Gly Trp
 305 310 315 320
 Lys Glu Leu Gln Trp Phe Thr Ile Asn Ala Met Lys Ser Ala Phe Ile
 325 330 335
 Pro Phe Asp Glu Arg Leu Ala Ile Ile Asp Glu Val Ile Lys Pro Ala
 340 345 350
 Tyr Gly Lys Leu Leu Gly
 355

<210> 172
 <211> 960
 <212> DNA
 <213> Micromonospora carbonacea

<220>
 <221> CDS
 <222> (1)..(960)

<220>
 <223> evrMR

<400> 172

atg gac ccc cgc atc gtc gac cgg ctg cgt tgc ccg gtc tgc gcg gaa	48
Met Asp Pro Arg Ile Val Asp Arg Leu Arg Cys Pro Val Cys Ala Glu	
1 5 10 15	
ccg ctc acc gag gcc gcc gcc ggg acc acc cgg gcg ctg cgc tgc ccg	96
Pro Leu Thr Glu Ala Ala Ala Gly Thr Thr Arg Ala Leu Arg Cys Pro	
20 25 30	
cgc cgg cac agc ttc gac gtg gcc cgc cag ggg tac gtc gac ctg ctc	144
Arg Arg His Ser Phe Asp Val Ala Arg Gln Gly Tyr Val Asp Leu Leu	
35 40 45	
gcc ggc cgg gcc ccg cac gtg ggc gac acc gcc gag atg gtg gcc gcc	192
Ala Gly Arg Ala Pro His Val Gly Asp Thr Ala Glu Met Val Ala Ala	
50 55 60	
cgc gcc gac ttc ctc gcc gcc ggg cac tac gac acg ctc tcg gcc gcg	240
Arg Ala Asp Phe Leu Ala Ala Gly His Tyr Asp Thr Leu Ser Ala Ala	
65 70 75 80	
ctc gcc gcc gcc gcg ctc gcc gcg ctg agc cac ccg ccg gag gcc ccc	288
Leu Ala Ala Ala Ala Leu Ala Ala Leu Ser His Pro Pro Glu Ala Pro	
85 90 95	
gga gcg gac gcg tcg gcc ggc aaa gac ggg cag gat gcc caa gcc ggg	336
Gly Ala Asp Ala Ser Ala Gly Lys Asp Gly Gln Asp Ala Gln Ala Gly	
100 105 110	
cgg gat gcg tcc gct gga cat gac gcg tcc gcc gga cag ccg gcc gtc	384
Arg Asp Ala Ser Ala Gly His Asp Ala Ser Ala Gly Gln Pro Ala Val	
115 120 125	
ggg acg tac ccg ctg gtg gtg gac gcc ggg gcg ggc acg ggc cgg cac	432
Gly Thr Tyr Pro Leu Val Val Asp Ala Gly Ala Gly Thr Gly Arg His	
130 135 140	
ctc gcc gcg gtg ctg gcg gcg ctg ccc gac gcc gtg ggc ctg gcc ctg	480
Leu Ala Ala Val Leu Ala Ala Leu Pro Asp Ala Val Gly Leu Ala Leu	
145 150 155 160	
gac gtc tcc aag ccg gcg ctg cgc cgg gca gcg cgg gcc cac ccg cgc	528
Asp Val Ser Lys Pro Ala Leu Arg Arg Ala Ala Arg Ala His Pro Arg	
165 170 175	
gcg gcg gcg gcg ctc gcc gac acc tgg cgg cgg ctt ccg ctg gcc gac	576
Ala Ala Ala Ala Leu Ala Asp Thr Trp Arg Arg Leu Pro Leu Ala Asp	
180 185 190	
gcc agc gtc gcc gtg ctg ctc gac gtc ttc gcc ccg cgc aac ggc gcg	624
Ala Ser Val Ala Val Leu Leu Asp Val Phe Ala Pro Arg Asn Gly Ala	
195 200 205	
gag ttc cgc cgg gtg ctc cac ccg gcc ggc gcg ctg ctc gtg gtc acc	672
Glu Phe Arg Arg Val Leu His Pro Ala Gly Ala Leu Leu Val Val Thr	
210 215 220	
ccc gcc gag gac cac ctc gcc gaa ctg gtc gac tcg ctc gac ctg ctg	720
Pro Ala Glu Asp His Leu Ala Glu Leu Val Asp Ser Leu Asp Leu Leu	
225 230 235 240	
aag gtc gac ccc gac aag gcg gac cgg gtc gcc ggg agc ctg gcc ggc	768
Lys Val Asp Pro Asp Lys Ala Asp Arg Val Ala Gly Ser Leu Ala Gly	
245 250 255	

cac ttc gag cag acc gcc gag agc gtg ctg cgg gcc cgg ctg gaa ctc 816
 His Phe Glu Gln Thr Ala Glu Ser Val Leu Arg Ala Arg Leu Glu Leu
 260 265 270
 acc ggc cgg cag gtg gcc acc ctg gtc ggg atg gga ccc agc gcc tgg 864
 Thr Gly Arg Gln Val Ala Thr Leu Val Gly Met Gly Pro Ser Ala Trp
 275 280 285
 cac acc gac ccg gcc acc ctc gcc gcc cgg atc gcc gcg cta ccc gag 912
 His Thr Asp Pro Ala Thr Leu Ala Ala Arg Ile Ala Ala Leu Pro Glu
 290 295 300
 ccg gtc cgg gtg acc ctc gcg gta cgg ctc ggc gtg tac cgc ccc cgc 960
 Pro Val Arg Val Thr Leu Ala Val Arg Leu Gly Val Tyr Arg Pro Arg
 305 310 315 320

<210> 173
 <211> 320
 <212> PRT
 <213> Micromonospora carbonacea

<220>
 <223> evrMR

<400> 173
 Met Asp Pro Arg Ile Val Asp Arg Leu Arg Cys Pro Val Cys Ala Glu
 1 5 10 15
 Pro Leu Thr Glu Ala Ala Ala Gly Thr Thr Arg Ala Leu Arg Cys Pro
 20 25 30
 Arg Arg His Ser Phe Asp Val Ala Arg Gln Gly Tyr Val Asp Leu Leu
 35 40 45
 Ala Gly Arg Ala Pro His Val Gly Asp Thr Ala Glu Met Val Ala Ala
 50 55 60
 Arg Ala Asp Phe Leu Ala Ala Gly His Tyr Asp Thr Leu Ser Ala Ala
 65 70 75 80
 Leu Ala Ala Ala Ala Leu Ala Ala Leu Ser His Pro Pro Glu Ala Pro
 85 90 95
 Gly Ala Asp Ala Ser Ala Gly Lys Asp Gly Gln Asp Ala Gln Ala Gly
 100 105 110
 Arg Asp Ala Ser Ala Gly His Asp Ala Ser Ala Gly Gln Pro Ala Val
 115 120 125
 Gly Thr Tyr Pro Leu Val Val Asp Ala Gly Ala Gly Thr Gly Arg His
 130 135 140
 Leu Ala Ala Val Leu Ala Ala Leu Pro Asp Ala Val Gly Leu Ala Leu
 145 150 155 160
 Asp Val Ser Lys Pro Ala Leu Arg Arg Ala Ala Arg Ala His Pro Arg
 165 170 175
 Ala Ala Ala Ala Leu Ala Asp Thr Trp Arg Arg Leu Pro Leu Ala Asp
 180 185 190
 Ala Ser Val Ala Val Leu Leu Asp Val Phe Ala Pro Arg Asn Gly Ala
 195 200 205

Glu Phe Arg Arg Val Leu His Pro Ala Gly Ala Leu Leu Val Val Thr
 210 215 220
 Pro Ala Glu Asp His Leu Ala Glu Leu Val Asp Ser Leu Asp Leu Leu
 225 230 235 240
 Lys Val Asp Pro Asp Lys Ala Asp Arg Val Ala Gly Ser Leu Ala Gly
 245 250 255
 His Phe Glu Gln Thr Ala Glu Ser Val Leu Arg Ala Arg Leu Glu Leu
 260 265 270
 Thr Gly Arg Gln Val Ala Thr Leu Val Gly Met Gly Pro Ser Ala Trp
 275 280 285
 His Thr Asp Pro Ala Thr Leu Ala Ala Arg Ile Ala Ala Leu Pro Glu
 290 295 300
 Pro Val Arg Val Thr Leu Ala Val Arg Leu Gly Val Tyr Arg Pro Arg
 305 310 315 320

<210> 174

<211> 579

<212> DNA

<213> *Micromonospora carbonacea*

<220>

<221> CDS

<222> (1)..(579)

<220>

<223> evrMR2

<400> 174

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Val Trp Glu Pro Gly Asp Glu Ile Glu Leu Arg Pro Thr Val Glu Ile	
1 5 10 15	
gag gcg cgc atc gcc gtg ctg cac gtg atc ctg gcc cgg tgt ttc ggc	96
Glu Ala Arg Ile Ala Val Leu His Val Ile Leu Ala Arg Cys Phe Gly	
20 25 30	
atg ccg gcg cag gcg gcg atg agc tgg ctg ctc aac tcc cac ctg gtc	144
Met Pro Ala Gln Ala Ala Met Ser Trp Leu Leu Asn Ser His Leu Val	
35 40 45	
gac ctg gtc acc ccg ccg gag tgg cag ttc gtg atg ggc ggc cgg ggc	192
Asp Leu Val Thr Pro Pro Glu Trp Gln Phe Val Met Gly Gly Arg Gly	
50 55 60	
gac cac cgg tcg ttc gtg ctg cac cac gac gcg ctg ttc tcg ctg gcc	240
Asp His Arg Ser Phe Val Leu His His Asp Ala Leu Phe Ser Leu Ala	
65 70 75 80	
tgg gtg ctc ggc ctg gcc aag cag ctc gac ccg acg ctg ccg gtc gac	288
Trp Val Leu Gly Leu Ala Lys Gln Leu Asp Pro Thr Leu Pro Val Asp	
85 90 95	
gag cgg ctg gtg gag cgg ctg ccg cac atc gcg ggc ggg gag agc ttc	336
Glu Arg Leu Val Glu Arg Leu Pro His Ile Ala Gly Gly Glu Ser Phe	
100 105 110	

cag cag tgg cgc tcc cgc atc ctg gcc gcg ccc cag cac ccg gcc gac	384
Gln Gln Trp Arg Ser Arg Ile Leu Ala Ala Pro Gln His Pro Ala Asp	
115 120 125	
gcg gcg gcc ctg ctc gac ctg cac tac tgc ctc gac tgg gcg tac ctg	432
Ala Ala Ala Leu Leu Asp Leu His Tyr Cys Leu Asp Trp Ala Tyr Leu	
130 135 140	
gag ctg gag cgc gac ggg cgg tcg ccg ccc ggc ctg gtc gac gcc aac	480
Glu Leu Glu Arg Asp Gly Arg Ser Pro Pro Gly Leu Val Asp Ala Asn	
145 150 155 160	
gcg atc ggg cag cgc cgg tgg gcg ctg gag tgg gcg gtc gtc ctg cga	528
Ala Ile Gly Gln Arg Arg Trp Ala Leu Glu Trp Ala Val Val Leu Arg	
165 170 175	
ggg ccc tac cac gag gag ccg ccg ggc tgg gaa gag gtc gac ctt tcc	576
Gly Pro Tyr His Glu Glu Pro Pro Gly Trp Glu Glu Val Asp Leu Ser	
180 185 190	
acc	579
Thr	

<210> 175

<211> 193

<212> PRT

<213> Micromonospora carbonacea

<220>

<223> evrMR2

<400> 175

Val Trp Glu Pro Gly Asp Glu Ile Glu Leu Arg Pro Thr Val Glu Ile	
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Glu Ala Arg Ile Ala Val Leu His Val Ile Leu Ala Arg Cys Phe Gly	
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Met Pro Ala Gln Ala Ala Met Ser Trp Leu Leu Asn Ser His Leu Val	
35 40 45	
Asp Leu Val Thr Pro Pro Glu Trp Gln Phe Val Met Gly Gly Arg Gly	
50 55 60	
Asp His Arg Ser Phe Val Leu His His Asp Ala Leu Phe Ser Leu Ala	
65 70 75 80	
Trp Val Leu Gly Leu Ala Lys Gln Leu Asp Pro Thr Leu Pro Val Asp	
85 90 95	
Glu Arg Leu Val Glu Arg Leu Pro His Ile Ala Gly Gly Glu Ser Phe	
100 105 110	
Gln Gln Trp Arg Ser Arg Ile Leu Ala Ala Pro Gln His Pro Ala Asp	
115 120 125	
Ala Ala Ala Leu Leu Asp Leu His Tyr Cys Leu Asp Trp Ala Tyr Leu	
130 135 140	
Glu Leu Glu Arg Asp Gly Arg Ser Pro Pro Gly Leu Val Asp Ala Asn	
145 150 155 160	
Ala Ile Gly Gln Arg Arg Trp Ala Leu Glu Trp Ala Val Val Leu Arg	
165 170 175	

Gly Pro Tyr His Glu Glu Pro Pro Gly Trp Glu Glu Val Asp Leu Ser
 180 185 190

Thr

<210> 176

<211> 1176

<212> DNA

<213> Micromonospora carbonacea

<220>

<221> CDS

<222> (1)..(1176)

<400> 176

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Val Trp Ile Glu Lys Asn Gly Pro Val Tyr Arg Ile Arg Asp Leu Val	
1 5 10 15	
cgc ggt aaa aag gtc acc att cag acc ggt tat ccg acg aag acc agc	96
Arg Gly Lys Lys Val Thr Ile Gln Thr Gly Tyr Pro Thr Lys Thr Ser	
20 25 30	
gcc aag aat gcg atg gtg cag ttc cgt gcg gag cag ttg cag ggc aac	144
Ala Lys Asn Ala Met Val Gln Phe Arg Ala Glu Gln Leu Gln Gly Asn	
35 40 45	
gcg ctc atg ccg cgc ggc ggt cag att acc ctc gcc gat ttc gtg ggg	192
Ala Leu Met Pro Arg Gly Gly Gln Ile Thr Leu Ala Asp Phe Val Gly	
50 55 60	
gag tgg tgg ccg agc tac gaa aag acg ctg aaa ccg acc gcc gtg aac	240
Glu Trp Trp Pro Ser Tyr Glu Lys Thr Leu Lys Pro Thr Ala Val Asn	
65 70 75 80	
tcg gag ggc aac cgg atc cgc aac cac ctc ctg ccc ata ctc ggc cat	288
Ser Glu Gly Asn Arg Ile Arg Asn His Leu Leu Pro Ile Leu Gly His	
85 90 95	
ctc acc ctt gac gag ctg gac ggg cag gtc acc cag cag tgg gtc aac	336
Leu Thr Leu Asp Glu Leu Asp Gly Gln Val Thr Gln Gln Trp Val Asn	
100 105 110	
gac ctg gag gcc ggc gtc ggc ccg tgg ccg gag tcc acg cgg ggt cgt	384
Asp Leu Glu Ala Gly Val Gly Pro Trp Pro Glu Ser Thr Arg Gly Arg	
115 120 125	
cgg aag ccg ctg gca gcg aag acg atc agc aac tgc cac ggc ctg ctg	432
Arg Lys Pro Leu Ala Ala Lys Thr Ile Ser Asn Cys His Gly Leu Leu	
130 135 140	
cac acg atc tgc ggc gcg gcg atc gcg gcg aaa ccg atc agg ctc aac	480
His Thr Ile Cys Gly Ala Ala Ile Ala Ala Lys Arg Ile Arg Leu Asn	
145 150 155 160	
ccg tgc tct tcg acg atg ctg ccc ccg cgc gag ccg aaa gag atg aag	528
Pro Cys Ser Ser Thr Met Leu Pro Arg Arg Glu Pro Lys Glu Met Lys	
165 170 175	
ttc ctg agc gac ccg gag atc ggt ccg ctt atc acg gcg ctt ccg ccg	576
Phe Leu Ser Asp Pro Glu Ile Gly Arg Leu Ile Thr Ala Leu Pro Pro	
180 185 190	

cac tgg cga ccg ctc gtc atg ctg ctg gtg gcg acc ggt ctg agg tgg 624
 His Trp Arg Pro Leu Val Met Leu Leu Val Ala Thr Gly Leu Arg Trp
 195 200 205

ggt gag gcg atc ggc ctg cgc gcc ggc cgg gtc gac ctg ctc gcc gcg 672
 Gly Glu Ala Ile Gly Leu Arg Ala Gly Arg Val Asp Leu Leu Ala Ala
 210 215 220

cgg ccc cgg ctg acc gtc gtc gag cag ctc cag gag ctg gcc agc acg 720
 Arg Pro Arg Leu Thr Val Val Glu Gln Leu Gln Glu Leu Ala Ser Thr
 225 230 235 240

gga gag ctc gtc ttc cag tcg ccg aag acc gcg aag ggc cgg cgc acg 768
 Gly Glu Leu Val Phe Gln Ser Pro Lys Thr Ala Lys Gly Arg Arg Thr
 245 250 255

gtc agt ttc acc acg aaa gtc gct cta ctg ctt acg cca ctc atc gcc 816
 Val Ser Phe Thr Thr Lys Val Ala Leu Leu Leu Thr Pro Leu Ile Ala
 260 265 270

gga aag aaa agt gac gag gtc gtg ttc acc gcg ccg aaa ggc ggg atg 864
 Gly Lys Lys Ser Asp Glu Val Val Phe Thr Ala Pro Lys Gly Gly Met
 275 280 285

gta agg acg cgc aat ttc cgg cgg atc tgg gtc aag gcg tgc gag gaa 912
 Val Arg Thr Arg Asn Phe Arg Arg Ile Trp Val Lys Ala Cys Glu Glu
 290 295 300

gcc ggg ctt ccg ggc tta cgc att cac gat ctg cgg cac act cac gcg 960
 Ala Gly Leu Pro Gly Leu Arg Ile His Asp Leu Arg His Thr His Ala
 305 310 315 320

gcg atc ctg att tct gcc ggg cgt ccg ctg tcg gcg atc tcc cgc cgc 1008
 Ala Ile Leu Ile Ser Ala Gly Arg Pro Leu Ser Ala Ile Ser Arg Arg
 325 330 335

ctc ggt cac tcg tcg atc gcg gtc acg gat ctg ctg tac ggg cac ctg 1056
 Leu Gly His Ser Ser Ile Ala Val Thr Asp Leu Leu Tyr Gly His Leu
 340 345 350

cgt gag gag gtc gac gag ggg atc ctc gcg gcg atc gag gag gcg atg 1104
 Arg Glu Glu Val Asp Glu Gly Ile Leu Ala Ala Ile Glu Glu Ala Met
 355 360 365

gcc ggc gtc cgg gct gag gac ctg gag gcg gaa ctc gac gag gag ctg 1152
 Ala Gly Val Arg Ala Glu Asp Leu Glu Ala Glu Leu Asp Glu Glu Leu
 370 375 380

acg gac gtg ttg gcc gac gca gca 1176
 Thr Asp Val Leu Ala Asp Ala Ala
 385 390

<210> 177

<211> 392

<212> PRT

<213> Micromonospora carbonacea

<400> 177

Val Trp Ile Glu Lys Asn Gly Pro Val Tyr Arg Ile Arg Asp Leu Val
 1 5 10 15

Arg Gly Lys Lys Val Thr Ile Gln Thr Gly Tyr Pro Thr Lys Thr Ser
 20 25 30

Ala	Lys	Asn	Ala	Met	Val	Gln	Phe	Arg	Ala	Glu	Gln	Leu	Gln	Gly	Asn	35	40	45
Ala	Leu	Met	Pro	Arg	Gly	Gly	Gln	Ile	Thr	Leu	Ala	Asp	Phe	Val	Gly	50	55	60
Glu	Trp	Trp	Pro	Ser	Tyr	Glu	Lys	Thr	Leu	Lys	Pro	Thr	Ala	Val	Asn	65	70	75
Ser	Glu	Gly	Asn	Arg	Ile	Arg	Asn	His	Leu	Leu	Pro	Ile	Leu	Gly	His	85	90	95
Leu	Thr	Leu	Asp	Glu	Leu	Asp	Gly	Gln	Val	Thr	Gln	Gln	Trp	Val	Asn	100	105	110
Asp	Leu	Glu	Ala	Gly	Val	Gly	Pro	Trp	Pro	Glu	Ser	Thr	Arg	Gly	Arg	115	120	125
Arg	Lys	Pro	Leu	Ala	Ala	Lys	Thr	Ile	Ser	Asn	Cys	His	Gly	Leu	Leu	130	135	140
His	Thr	Ile	Cys	Gly	Ala	Ala	Ile	Ala	Ala	Lys	Arg	Ile	Arg	Leu	Asn	145	150	155
Pro	Cys	Ser	Ser	Thr	Met	Leu	Pro	Arg	Arg	Glu	Pro	Lys	Glu	Met	Lys	165	170	175
Phe	Leu	Ser	Asp	Pro	Glu	Ile	Gly	Arg	Leu	Ile	Thr	Ala	Leu	Pro	Pro	180	185	190
His	Trp	Arg	Pro	Leu	Val	Met	Leu	Leu	Val	Ala	Thr	Gly	Leu	Arg	Trp	195	200	205
Gly	Glu	Ala	Ile	Gly	Leu	Arg	Ala	Gly	Arg	Val	Asp	Leu	Leu	Ala	Ala	210	215	220
Arg	Pro	Arg	Leu	Thr	Val	Val	Glu	Gln	Leu	Gln	Glu	Leu	Ala	Ser	Thr	225	230	235
Gly	Glu	Leu	Val	Phe	Gln	Ser	Pro	Lys	Thr	Ala	Lys	Gly	Arg	Arg	Thr	245	250	255
Val	Ser	Phe	Thr	Thr	Lys	Val	Ala	Leu	Leu	Leu	Thr	Pro	Leu	Ile	Ala	260	265	270
Gly	Lys	Lys	Ser	Asp	Glu	Val	Val	Phe	Thr	Ala	Pro	Lys	Gly	Gly	Met	275	280	285
Val	Arg	Thr	Arg	Asn	Phe	Arg	Arg	Ile	Trp	Val	Lys	Ala	Cys	Glu	Glu	290	295	300
Ala	Gly	Leu	Pro	Gly	Leu	Arg	Ile	His	Asp	Leu	Arg	His	Thr	His	Ala	305	310	315
Ala	Ile	Leu	Ile	Ser	Ala	Gly	Arg	Pro	Leu	Ser	Ala	Ile	Ser	Arg	Arg	325	330	335
Leu	Gly	His	Ser	Ser	Ile	Ala	Val	Thr	Asp	Leu	Leu	Tyr	Gly	His	Leu	340	345	350
Arg	Glu	Glu	Val	Asp	Glu	Gly	Ile	Leu	Ala	Ala	Ile	Glu	Glu	Ala	Met	355	360	365
Ala	Gly	Val	Arg	Ala	Glu	Asp	Leu	Glu	Ala	Glu	Leu	Asp	Glu	Glu	Leu			

370	375	380
Thr Asp Val Leu Ala Asp Ala Ala		
385	390	
<210> 178		
<211> 26		
<212> DNA		
<213> Artificial Sequence		
<220>		
<223> Description of Artificial Sequence: Primer		
<400> 178		
ccctcgagat gtccagcaag atccta		26
<210> 179		
<211> 24		
<212> DNA		
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<220>		
<223> Description of Artificial Sequence: Primer		
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<210> 180		
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<212> DNA		
<213> Artificial Sequence		
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<223> Description of Artificial Sequence: Primer		
<400> 180		
ccctcgagaa tgtccagcaa gaccta		27
<210> 181		
<211> 25		
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<223> Description of Artificial Sequence: Primer		
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cgaattcaga ctgctctgcc gccgc		25
<210> 182		
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<400> 182		
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tgggcaccgg cgcgcggatc aaccgggtgcg gtggttccca gggtccggcc gcgcggcccc 120		
gacgcaccgc ccccggtgtg agaaggggac ccatctctac cgtaggcgtt aacaaggggc 180		

ccttcctttc	accgcaggtg	caggacgtct	cctgcggcga	gggtgcgcgg	gcccgcgcgg	240
gtgtcgacca	gcagccggcc	gtcggcgctc	acgccggctc	ccacgccggt	cacctccgca	300
ccgccgggca	gcagcacccg	caccgggtct	ccgaccgtcg	cgcaggccgc	caggtacgcg	360
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gcgacagagc	gcagcagtgc	gcgcagcagc	gggtcccggg	cggtggcgac	ggccccggcg	480
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cccggactcg	gcgaaccagc	cgtacgacat	gcaccgggtc	atcgagcacg	tgctggacga	2100
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<220>

<223> ORF1

<400> 183

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<400> 184																
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 Arg Ala Val Ser Lys Gln His Ala Arg Gly Lys Lys Thr Ala Arg Glu
 35 40 45
 cgg atc ggg ctg ctg ctc gac gag ggg tcc ttc gtc gag ctg gac ggg 192
 Arg Ile Gly Leu Leu Leu Asp Glu Gly Ser Phe Val Glu Leu Asp Gly
 50 55 60
 ttc gcc cgg cac cgg tcc acc aac ttc ggc ctg gac cgc acc cgc ccg 240
 Phe Ala Arg His Arg Ser Thr Asn Phe Gly Leu Asp Arg Thr Arg Pro

65	70				75				80				
tac ggc gac ggg gtg atc acc ggc tac ggc acg gtc gac ggg cgg cag	Tyr Gly Asp Gly Val Ile Thr Gly Tyr Gly Thr Val Asp Gly Arg Gln				85 90 95								288
gtc tgc gtc ttc gcg cag gac ttc acg gtc ttc ggc ggc tcc ctc ggc	Val Cys Val Phe Ala Gln Asp Phe Thr Val Phe Gly Gly Ser Leu Gly				100 105 110								336
gag gtg ttc ggc gaa aag atc gtc aag gtg atg gac ctg gcc atg aag	Glu Val Phe Gly Glu Lys Ile Val Lys Val Met Asp Leu Ala Met Lys				115 120 125								384
atc ggc tgc ccg gtc gtc ggc atc aac gac tcc ggc ggc gcc cgc atc	Ile Gly Cys Pro Val Val Gly Ile Asn Asp Ser Gly Gly Ala Arg Ile				130 135 140								432
cag gag ggc gtg gcg tcc ctc ggg ctc tac ggc gag atc ttc ttc cgc	Gln Glu Gly Val Ala Ser Leu Gly Leu Tyr Gly Glu Ile Phe Phe Arg				145 150 155 160								480
aac gtg cgg gcc agc ggc gtc atc ccg cag atc tcc ctg atc atg ggc	Asn Val Arg Ala Ser Gly Val Ile Pro Gln Ile Ser Leu Ile Met Gly				165 170 175								528
ccg tgc gcg ggc ggc gcg gtc tat tct ccg gcg gtc acc gac ttc acc	Pro Cys Ala Gly Gly Ala Val Tyr Ser Pro Ala Val Thr Asp Phe Thr				180 185 190								576
gtg atg gtc gac cag acc tcg cac atg ttc atc acc ggc ccc gac gtg	Val Met Val Asp Gln Thr Ser His Met Phe Ile Thr Gly Pro Asp Val				195 200 205								624
atc aag acg gtc acc ggc gag gac gtc ggg atg gag gaa ctg ggc ggt	Ile Lys Thr Val Thr Gly Glu Asp Val Gly Met Glu Glu Leu Gly Gly				210 215 220								672
gcc cgc acc cac aac gcg cgc agc ggc aac gcg cac tac ctc ggc acc	Ala Arg Thr His Asn Ala Arg Ser Gly Asn Ala His Tyr Leu Gly Thr				225 230 235 240								720
gac gag gag gac gcg atc gag tac gtc aag gcg ctg ctg tcg tac ctg	Asp Glu Glu Asp Ala Ile Glu Tyr Val Lys Ala Leu Leu Ser Tyr Leu				245 250 255								768
ccg tcg aac aac ctg gac gag ccg ccg gtc ttc gac gcc ccg gcc gac	Pro Ser Asn Asn Leu Asp Glu Pro Pro Val Phe Asp Ala Pro Ala Asp				260 265 270								816
gtg gcg atc agc gac gcc gac cgg gag ctg gac agc ctc gtc ccg gac	Val Ala Ile Ser Asp Ala Asp Arg Glu Leu Asp Ser Leu Val Pro Asp				275 280 285								864
tcg gcg aac cag ccg tac gac atg cac cgg gtc atc gag cac gtg ctg	Ser Ala Asn Gln Pro Tyr Asp Met His Arg Val Ile Glu His Val Leu				290 295 300								912
gac gac ggg gag ttc ctg gag gtc cag ccg ctg tac gcg cag aac atg	Asp Asp Gly Glu Phe Leu Glu Val Gln Pro Leu Tyr Ala Gln Asn Met				305 310 315 320								960
gtg gtc ggc ttc ggt cga atc gag gga cga ccg gtc ggc gtg gtg gcc	Val Val Gly Phe Gly Arg Ile Glu Gly Arg Pro Val Gly Val Val Ala				325 330 335								1008

aac cag ccg atg cac ctc gcc ggc acg ctg gac atc gcc gcg tcg gag	1056
Asn Gln Pro Met His Leu Ala Gly Thr Leu Asp Ile Ala Ala Ser Glu	
340 345 350	
aag gcc gcc cgg ttc gtg cgc acc tgc gac gcg ttc aac atc ccc gtg	1104
Lys Ala Ala Arg Phe Val Arg Thr Cys Asp Ala Phe Asn Ile Pro Val	
355 360 365	
ctg acc ttc gtg gac gtg ccc ggg ttc cta ccc ggc acc ggc cag gag	1152
Leu Thr Phe Val Asp Val Pro Gly Phe Leu Pro Gly Thr Gly Gln Glu	
370 375 380	
tgg gac ggc atc atc cgg cgc ggc gcg aag ctc atc tac gcg tac gcc	1200
Trp Asp Gly Ile Ile Arg Arg Gly Ala Lys Leu Ile Tyr Ala Tyr Ala	
385 390 395 400	
gag gcg acc gtc ccg aag gtc acc gtg atc acc cgc aag gcg tac ggc	1248
Glu Ala Thr Val Pro Lys Val Thr Val Ile Thr Arg Lys Ala Tyr Gly	
405 410 415	
ggg gcg tac gac gtg atg ggc tcc aag cac ctg ggc gcg gat ctg aac	1296
Gly Ala Tyr Asp Val Met Gly Ser Lys His Leu Gly Ala Asp Leu Asn	
420 425 430	
ttc gcc tgg ccg acc gcg cag atc gcg gtg atg ggc gcg cag ggc gcg	1344
Phe Ala Trp Pro Thr Ala Gln Ile Ala Val Met Gly Ala Gln Gly Ala	
435 440 445	
gtg aac atc ctg tac ccg cag gag ctg gcc gcc gcc gag gac ccg gcc	1392
Val Asn Ile Leu Tyr Arg Gln Glu Leu Ala Ala Ala Glu Asp Pro Ala	
450 455 460	
gcc gtg cgc gcc gag aag atc gcc gag tac gag gac acc ctg gcc aac	1440
Ala Val Arg Ala Glu Lys Ile Ala Glu Tyr Glu Asp Thr Leu Ala Asn	
465 470 475 480	
ccg tac gtc gcc gcc gag cgc ggg tac gtc gac tcg gtg atc ccg ccg	1488
Pro Tyr Val Ala Ala Glu Arg Gly Tyr Val Asp Ser Val Ile Pro Pro	
485 490 495	
cac gag acg cgt acc cag atc gtc cgg gcg ttg cgg gtg ctg cgc acc	1536
His Glu Thr Arg Thr Gln Ile Val Arg Ala Leu Arg Val Leu Arg Thr	
500 505 510	
aag cgc gag acg ctc ccg gcg aag aag cac ggc aac atc ccg ctc	1581
Lys Arg Glu Thr Leu Pro Ala Lys Lys His Gly Asn Ile Pro Leu	
515 520 525	

<210> 186

<211> 527

<212> PRT

<213> Micromonospora carbonacea

<220>

<223> ORF2

<400> 186

Val Thr Thr Glu Thr Gly Ile Asn Ile His Ser Thr Ala Gly Lys Leu
1 5 10 15

Ala Asp Leu Glu Arg Arg Val Asp Glu Ala Val His Ala Gly Ser Ala
20 25 30

Arg	Ala	Val	Ser	Lys	Gln	His	Ala	Arg	Gly	Lys	Lys	Thr	Ala	Arg	Glu	35	40	45
Arg	Ile	Gly	Leu	Leu	Leu	Asp	Glu	Gly	Ser	Phe	Val	Glu	Leu	Asp	Gly	50	55	60
Phe	Ala	Arg	His	Arg	Ser	Thr	Asn	Phe	Gly	Leu	Asp	Arg	Thr	Arg	Pro	65	70	75
Tyr	Gly	Asp	Gly	Val	Ile	Thr	Gly	Tyr	Gly	Thr	Val	Asp	Gly	Arg	Gln	85	90	95
Val	Cys	Val	Phe	Ala	Gln	Asp	Phe	Thr	Val	Phe	Gly	Gly	Ser	Leu	Gly	100	105	110
Glu	Val	Phe	Gly	Glu	Lys	Ile	Val	Lys	Val	Met	Asp	Leu	Ala	Met	Lys	115	120	125
Ile	Gly	Cys	Pro	Val	Val	Gly	Ile	Asn	Asp	Ser	Gly	Gly	Ala	Arg	Ile	130	135	140
Gln	Glu	Gly	Val	Ala	Ser	Leu	Gly	Leu	Tyr	Gly	Glu	Ile	Phe	Phe	Arg	145	150	155
Asn	Val	Arg	Ala	Ser	Gly	Val	Ile	Pro	Gln	Ile	Ser	Leu	Ile	Met	Gly	165	170	175
Pro	Cys	Ala	Gly	Gly	Ala	Val	Tyr	Ser	Pro	Ala	Val	Thr	Asp	Phe	Thr	180	185	190
Val	Met	Val	Asp	Gln	Thr	Ser	His	Met	Phe	Ile	Thr	Gly	Pro	Asp	Val	195	200	205
Ile	Lys	Thr	Val	Thr	Gly	Glu	Asp	Val	Gly	Met	Glu	Glu	Leu	Gly	Gly	210	215	220
Ala	Arg	Thr	His	Asn	Ala	Arg	Ser	Gly	Asn	Ala	His	Tyr	Leu	Gly	Thr	225	230	235
Asp	Glu	Glu	Asp	Ala	Ile	Glu	Tyr	Val	Lys	Ala	Leu	Leu	Ser	Tyr	Leu	245	250	255
Pro	Ser	Asn	Asn	Leu	Asp	Glu	Pro	Pro	Val	Phe	Asp	Ala	Pro	Ala	Asp	260	265	270
Val	Ala	Ile	Ser	Asp	Ala	Asp	Arg	Glu	Leu	Asp	Ser	Leu	Val	Pro	Asp	275	280	285
Ser	Ala	Asn	Gln	Pro	Tyr	Asp	Met	His	Arg	Val	Ile	Glu	His	Val	Leu	290	295	300
Asp	Asp	Gly	Glu	Phe	Leu	Glu	Val	Gln	Pro	Leu	Tyr	Ala	Gln	Asn	Met	305	310	315
Val	Val	Gly	Phe	Gly	Arg	Ile	Glu	Gly	Arg	Pro	Val	Gly	Val	Val	Ala	325	330	335
Asn	Gln	Pro	Met	His	Leu	Ala	Gly	Thr	Leu	Asp	Ile	Ala	Ala	Ser	Glu	340	345	350
Lys	Ala	Ala	Arg	Phe	Val	Arg	Thr	Cys	Asp	Ala	Phe	Asn	Ile	Pro	Val	355	360	365
Leu	Thr	Phe	Val	Asp	Val	Pro	Gly	Phe	Leu	Pro	Gly	Thr	Gly	Gln	Glu	370	375	380

Trp Asp Gly Ile Ile Arg Arg Gly Ala Lys Leu Ile Tyr Ala Tyr Ala
 385 390 395 400
 Glu Ala Thr Val Pro Lys Val Thr Val Ile Thr Arg Lys Ala Tyr Gly
 405 410 415
 Gly Ala Tyr Asp Val Met Gly Ser Lys His Leu Gly Ala Asp Leu Asn
 420 425 430
 Phe Ala Trp Pro Thr Ala Gln Ile Ala Val Met Gly Ala Gln Gly Ala
 435 440 445
 Val Asn Ile Leu Tyr Arg Gln Glu Leu Ala Ala Ala Glu Asp Pro Ala
 450 455 460
 Ala Val Arg Ala Glu Lys Ile Ala Glu Tyr Glu Asp Thr Leu Ala Asn
 465 470 475 480
 Pro Tyr Val Ala Ala Glu Arg Gly Tyr Val Asp Ser Val Ile Pro Pro
 485 490 495
 His Glu Thr Arg Thr Gln Ile Val Arg Ala Leu Arg Val Leu Arg Thr
 500 505 510
 Lys Arg Glu Thr Leu Pro Ala Lys Lys His Gly Asn Ile Pro Leu
 515 520 525

<210> 187
 <211> 888
 <212> DNA
 <213> Micromonospora carbonacea

<220>
 <221> CDS
 <222> (1) .. (888)

<220>
 <223> ORF3

<400> 187
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 Met His Arg Asp Leu Arg Asp Val Arg Trp Pro Glu Pro Ala Asp Ile
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 cgc gcc cgg gcc cgc cgc cgc agc cgg cgt acg gcg atg gcg gcg gcc 96
 Arg Ala Arg Ala Arg Arg Arg Ser Arg Arg Thr Ala Met Ala Ala Ala
 20 25 30
 gcg gcc gtg ctg gcc gta ctc tcg gtc ttc gcc gtg gcg gtc ggc ggc 144
 Ala Ala Val Leu Ala Val Leu Ser Val Phe Ala Val Ala Val Gly Gly
 35 40 45
 cgg gcc ggc ggg cac ctc gcg ccg ccg atg tcc tgg gtc gac ggc tgg 192
 Arg Ala Gly Gly His Leu Ala Pro Pro Met Ser Trp Val Asp Gly Trp
 50 55 60
 cgc gcg tct acc gag ccg gag cgg tcc ggc cgg acc gag atc ggc cag 240
 Arg Ala Ser Thr Glu Pro Glu Arg Ser Gly Arg Thr Glu Ile Gly Gln
 65 70 75 80
 gag gcc ctg ctg gac ccg gcc gac ctg ggc gtg ccg agc aac gta cga 288

Glu	Ala	Leu	Leu	Asp	Pro	Ala	Asp	Leu	Gly	Val	Pro	Ser	Asn	Val	Arg		
				85					90					95			
ctg	ggg	gac	tct	ggg	ctt	cag	gag	cag	gtc	cgg	gtg	gac	ccg	ctg	ctc	336	
Leu	Gly	Asp	Ser	Gly	Leu	Gln	Glu	Gln	Val	Arg	Val	Asp	Pro	Leu	Leu		
			100					105					110				
cag	tcg	tgc	gcc	gtg	ggc	aag	gag	cgg	ggg	gcg	ggg	ccg	ccg	gtg	tct	384	
Gln	Ser	Cys	Ala	Val	Gly	Lys	Glu	Pro	Gly	Ala	Gly	Pro	Pro	Val	Ser		
		115					120					125					
cgc	tac	tcg	cga	tcc	cag	acg	ctg	ctc	ctg	gac	gac	acg	tcg	ggc	cag	432	
Arg	Tyr	Ser	Arg	Ser	Gln	Thr	Leu	Leu	Leu	Asp	Asp	Thr	Ser	Gly	Gln		
	130					135						140					
gac	ggg	tcg	atg	gcc	gtc	ccc	gtc	ctc	acc	cag	gac	gtc	tac	cgc	ctc	480	
Asp	Gly	Ser	Met	Ala	Val	Pro	Val	Leu	Thr	Gln	Asp	Val	Tyr	Arg	Leu		
	145				150					155					160		
gac	ccc	gcc	ccg	gcc	ggc	cgg	ctg	ctc	gcc	gac	ctg	gac	cgg	gcg	gcg	528	
Asp	Pro	Ala	Pro	Ala	Gly	Arg	Leu	Leu	Ala	Asp	Leu	Asp	Arg	Ala	Ala		
				165					170					175			
acc	acc	tgc	gcc	cgc	tgg	agc	gac	acg	gcg	gtt	cgg	ccc	ctg	gac	gac	576	
Thr	Thr	Cys	Ala	Arg	Trp	Ser	Asp	Thr	Ala	Val	Arg	Pro	Leu	Asp	Asp		
			180					185					190				
ggc	cgt	ggc	gcg	atc	tcg	gtg	gcc	cac	acc	tgg	cag	acg	atc	gcc	cgc	624	
Gly	Arg	Gly	Ala	Ile	Ser	Val	Ala	His	Thr	Trp	Gln	Thr	Ile	Ala	Arg		
		195				200						205					
gac	ttc	gcc	ggc	gac	gag	gcg	gtc	gtg	ttg	cgg	cac	acc	gtg	atg	tcc	672	
Asp	Phe	Ala	Gly	Asp	Glu	Ala	Val	Val	Leu	Arg	His	Thr	Val	Met	Ser		
	210				215						220						
ccg	gtg	gac	ccc	acg	acg	ggc	aag	ccc	ctc	gac	gtg	ggg	tac	ccg	ccg	720	
Pro	Val	Asp	Pro	Thr	Thr	Gly	Lys	Pro	Leu	Asp	Val	Gly	Tyr	Pro	Pro		
	225				230					235					240		
gaa	acc	cgg	atg	atc	gtc	cgg	gtc	ggc	gac	ctg	gtc	acc	gtc	atc	gtg	768	
Glu	Thr	Arg	Met	Ile	Val	Arg	Val	Gly	Asp	Leu	Val	Thr	Val	Ile	Val		
				245					250					255			
ccc	gag	cgc	ggg	ttg	ggc	gtc	gac	ggg	ccg	gac	ggc	ccc	cgc	gag	acc	816	
Pro	Glu	Arg	Gly	Leu	Gly	Val	Asp	Gly	Pro	Asp	Gly	Pro	Arg	Glu	Thr		
			260					265					270				
agc	gac	gcg	gag	ctg	ctc	gaa	ctg	ggc	cgc	acg	gcc	gcc	cgg	cgg	atg	864	
Ser	Asp	Ala	Glu	Leu	Leu	Glu	Leu	Gly	Arg	Thr	Ala	Ala	Arg	Arg	Met		
		275				280						285					
tgc	ctc	gcc	gcc	aac	ccg	gcg	tgc									888	
Cys	Leu	Ala	Ala	Asn	Pro	Ala	Cys										
	290					295											

<210> 188

<211> 296

<212> PRT

<213> Micromonospora carbonacea

<220>

<223> ORF3

<400> 188

Met His Arg Asp Leu Arg Asp Val Arg Trp Pro Glu Pro Ala Asp Ile
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 Arg Ala Arg Ala Arg Arg Arg Ser Arg Arg Thr Ala Met Ala Ala Ala
 20 25 30
 Ala Ala Val Leu Ala Val Leu Ser Val Phe Ala Val Ala Val Gly Gly
 35 40 45
 Arg Ala Gly Gly His Leu Ala Pro Pro Met Ser Trp Val Asp Gly Trp
 50 55 60
 Arg Ala Ser Thr Glu Pro Glu Arg Ser Gly Arg Thr Glu Ile Gly Gln
 65 70 75 80
 Glu Ala Leu Leu Asp Pro Ala Asp Leu Gly Val Pro Ser Asn Val Arg
 85 90 95
 Leu Gly Asp Ser Gly Leu Gln Glu Gln Val Arg Val Asp Pro Leu Leu
 100 105 110
 Gln Ser Cys Ala Val Gly Lys Glu Pro Gly Ala Gly Pro Pro Val Ser
 115 120 125
 Arg Tyr Ser Arg Ser Gln Thr Leu Leu Leu Asp Asp Thr Ser Gly Gln
 130 135 140
 Asp Gly Ser Met Ala Val Pro Val Leu Thr Gln Asp Val Tyr Arg Leu
 145 150 155 160
 Asp Pro Ala Pro Ala Gly Arg Leu Leu Ala Asp Leu Asp Arg Ala Ala
 165 170 175
 Thr Thr Cys Ala Arg Trp Ser Asp Thr Ala Val Arg Pro Leu Asp Asp
 180 185 190
 Gly Arg Gly Ala Ile Ser Val Ala His Thr Trp Gln Thr Ile Ala Arg
 195 200 205
 Asp Phe Ala Gly Asp Glu Ala Val Val Leu Arg His Thr Val Met Ser
 210 215 220
 Pro Val Asp Pro Thr Thr Gly Lys Pro Leu Asp Val Gly Tyr Pro Pro
 225 230 235 240
 Glu Thr Arg Met Ile Val Arg Val Gly Asp Leu Val Thr Val Ile Val
 245 250 255
 Pro Glu Arg Gly Leu Gly Val Asp Gly Pro Asp Gly Pro Arg Glu Thr
 260 265 270
 Ser Asp Ala Glu Leu Leu Glu Leu Gly Arg Thr Ala Ala Arg Arg Met
 275 280 285
 Cys Leu Ala Ala Asn Pro Ala Cys
 290 295

<210> 189

<211> 498

<212> DNA

<213> Micromonospora carbonacea

<220>

<221> CDS

<222> (1) .. (498)

<220>

<223> ORF4

<400> 189

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atg ccg gac gcc gag ggg ttc gac gag ttc tac cgg ggc agc cgg caa 48
Met Pro Asp Ala Glu Gly Phe Asp Glu Phe Tyr Arg Gly Ser Arg Gln
  1              5              10              15

cga ttg ctg ggt ttc gtg tac atg atc acc gga aac ctg gcc gag gcg 96
Arg Leu Leu Gly Phe Val Tyr Met Ile Thr Gly Asn Leu Ala Glu Ala
              20              25              30

cag gac gcc gtg cag gag gcg tac atc cgc gca tgg cag cgc tgg ccg 144
Gln Asp Ala Val Gln Glu Ala Tyr Ile Arg Ala Trp Gln Arg Trp Pro
              35              40              45

acc gta cgc ggg tac gac gat ccg gag ggc tgg ctg cgc gtg gtg gcg 192
Thr Val Arg Gly Tyr Asp Asp Pro Glu Gly Trp Leu Arg Val Val Ala
              50              55              60

agc cgg atc gcg gtg agc cgg tgg cgc agc atg cgt agc cgg gcg cgg 240
Ser Arg Ile Ala Val Ser Arg Trp Arg Ser Met Arg Ser Arg Ala Arg
              65              70              75              80

gcg tac ctg cgg cac ggt gcg ccg gag agc gtc ccc gcg ccg agc acc 288
Ala Tyr Leu Arg His Gly Ala Pro Glu Ser Val Pro Ala Pro Ser Thr
              85              90              95

gcg acg ctg gag gtg gtg gcg gcg cta cgc cgg ctg ccc gag gcg cag 336
Ala Thr Leu Glu Val Val Ala Ala Leu Arg Arg Leu Pro Glu Ala Gln
              100              105              110

cgc acc gcc atc gcc ctg cac tac ctg ctc ggc atg ccg gtg gcc gag 384
Arg Thr Ala Ile Ala Leu His Tyr Leu Leu Gly Met Pro Val Ala Glu
              115              120              125

gtg gca cgg gag acc gcc gcc ccg gtc ggc acc gtg aaa gcc cgt ctc 432
Val Ala Arg Glu Thr Ala Ala Pro Val Gly Thr Val Lys Ala Arg Leu
              130              135              140

tcc cgg ggg cgt gcc gcg ctc gcc ggg ctg ctc gcc gtc tct gac ctg 480
Ser Arg Gly Arg Ala Ala Leu Ala Gly Leu Leu Ala Val Ser Asp Leu
              145              150              155              160

gag gag gcc gcc gat gcg
Glu Glu Ala Ala Asp Ala
              165

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<210> 190

<211> 166

<212> PRT

<213> Micromonospora carbonacea

<220>

<223> ORF4

<400> 190

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Met Pro Asp Ala Glu Gly Phe Asp Glu Phe Tyr Arg Gly Ser Arg Gln
  1              5              10              15

Arg Leu Leu Gly Phe Val Tyr Met Ile Thr Gly Asn Leu Ala Glu Ala

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20					25					30					
Gln	Asp	Ala	Val	Gln	Glu	Ala	Tyr	Ile	Arg	Ala	Trp	Gln	Arg	Trp	Pro
	35						40					45			
Thr	Val	Arg	Gly	Tyr	Asp	Asp	Pro	Glu	Gly	Trp	Leu	Arg	Val	Val	Ala
	50					55					60				
Ser	Arg	Ile	Ala	Val	Ser	Arg	Trp	Arg	Ser	Met	Arg	Ser	Arg	Ala	Arg
	65					70					75				80
Ala	Tyr	Leu	Arg	His	Gly	Ala	Pro	Glu	Ser	Val	Pro	Ala	Pro	Ser	Thr
				85					90					95	
Ala	Thr	Leu	Glu	Val	Val	Ala	Ala	Leu	Arg	Arg	Leu	Pro	Glu	Ala	Gln
			100					105					110		
Arg	Thr	Ala	Ile	Ala	Leu	His	Tyr	Leu	Leu	Gly	Met	Pro	Val	Ala	Glu
		115					120					125			
Val	Ala	Arg	Glu	Thr	Ala	Ala	Pro	Val	Gly	Thr	Val	Lys	Ala	Arg	Leu
	130					135					140				
Ser	Arg	Gly	Arg	Ala	Ala	Leu	Ala	Gly	Leu	Leu	Ala	Val	Ser	Asp	Leu
	145					150					155				160
Glu	Glu	Ala	Ala	Asp	Ala										
				165											

<210> 191
 <211> 840
 <212> DNA
 <213> Micromonospora carbonacea

<220>
 <221> CDS
 <222> (1) .. (840)

<220>
 <223> ORF5

<400> 191																
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Val	Arg	Pro	Gly	Ala	Gly	Arg	Pro	Gly	Pro	Gly	Arg	Ala	Pro	Arg	Pro	
	1				5				10					15		
tgg	cgg	gcg	cgc	ggc	gcg	cga	acc	ggg	ccg	ggg	ccg	cta	ggc	tgc	ggc	96
Trp	Arg	Ala	Arg	Gly	Ala	Arg	Thr	Gly	Pro	Gly	Pro	Leu	Gly	Cys	Gly	
			20					25					30			
ccc	gtg	gac	ctg	atc	gac	ggc	ctg	agc	gtc	gtc	tgg	aac	gaa	ctc	gtc	144
Pro	Val	Asp	Leu	Ile	Asp	Gly	Leu	Ser	Val	Val	Trp	Asn	Glu	Leu	Val	
		35					40					45				
ggc	gcg	caa	ccc	gac	ccg	cca	ccg	ctg	ctg	gtc	ctg	gcc	acc	gcc	gcc	192
Gly	Ala	Gln	Pro	Asp	Pro	Pro	Pro	Leu	Leu	Val	Leu	Ala	Thr	Ala	Ala	
	50					55					60					
gtc	gcg	ctg	gcg	gtg	gtc	gcc	acc	cgg	gtg	ccc	tgg	cgg	gtc	gcg	cgt	240
Val	Ala	Leu	Ala	Val	Val	Ala	Thr	Arg	Val	Pro	Trp	Arg	Val	Ala	Arg	
	65				70				75						80	
aac	gcg	gtg	acc	atc	gcc	cac	gag	ggc	ggc	cat	gcg	ctg	gcc	gcc	ctg	288

Asn	Ala	Val	Thr	Ile	Ala	His	Glu	Gly	Gly	His	Ala	Leu	Ala	Ala	Leu		
				85					90					95			
ctc	acc	ggg	cgg	aag	ctg	cgc	ggc	atc	cgg	ctg	cac	tcg	gac	acc	tcc	336	
Leu	Thr	Gly	Arg	Lys	Leu	Arg	Gly	Ile	Arg	Leu	His	Ser	Asp	Thr	Ser		
			100					105					110				
ggg	ctc	acc	ctg	tcg	gcc	ggc	cgc	ccc	acc	ggg	ctg	ggc	atg	atc	ctc	384	
Gly	Leu	Thr	Leu	Ser	Ala	Gly	Arg	Pro	Thr	Gly	Leu	Gly	Met	Ile	Leu		
		115					120					125					
acc	ctg	ttc	gcc	ggg	tac	gtc	gcc	ccg	acc	ctg	ctc	ggg	ctg	gcc	ggg	432	
Thr	Leu	Phe	Ala	Gly	Tyr	Val	Ala	Pro	Thr	Leu	Leu	Gly	Leu	Ala	Gly		
	130					135					140						
gcg	tgg	ctg	ctc	gcc	ggg	aac	cgg	atc	acc	atg	ctg	ctc	tcg	gtc	acg	480	
Ala	Trp	Leu	Leu	Ala	Gly	Asn	Arg	Ile	Thr	Met	Leu	Leu	Ser	Val	Thr		
145					150				155						160		
gtg	gtg	ctg	ctg	ctg	gcc	atg	ctg	gcg	atg	atc	cgc	aac	gtc	tac	ggg	528	
Val	Val	Leu	Leu	Leu	Ala	Met	Leu	Ala	Met	Ile	Arg	Asn	Val	Tyr	Gly		
				165					170					175			
gca	ctg	tcg	ctg	ctc	gcc	acc	ggc	ggg	ctg	gtc	ttc	gcc	gtc	tcc	tgg	576	
Ala	Leu	Ser	Leu	Leu	Ala	Thr	Gly	Gly	Leu	Val	Phe	Ala	Val	Ser	Trp		
			180					185					190				
tac	gcc	ccg	ccg	cag	gtg	cag	gcc	gcg	ttc	gcc	tgg	acc	tcg	gtc	tgg	624	
Tyr	Ala	Pro	Pro	Gln	Val	Gln	Ala	Ala	Phe	Ala	Trp	Thr	Ser	Val	Trp		
		195					200					205					
ttc	ctg	ctg	ttc	ggc	ggc	gtg	cgt	ccg	gtg	atc	gag	ttg	cag	cgg	ctg	672	
Phe	Leu	Leu	Phe	Gly	Gly	Val	Arg	Pro	Val	Ile	Glu	Leu	Gln	Arg	Leu		
	210					215					220						
cgc	agc	cgt	ggc	cgg	atg	ccg	gag	tcc	gac	gcc	gac	cag	ctc	gcc	cgg	720	
Arg	Ser	Arg	Gly	Arg	Met	Pro	Glu	Ser	Asp	Ala	Asp	Gln	Leu	Ala	Arg		
225					230				235						240		
ttg	acg	ccg	ttc	ccg	ccc	ctg	ttc	tgg	gtc	ggg	gtc	ttc	ctg	gtc	gtc	768	
Leu	Thr	Pro	Phe	Pro	Pro	Leu	Phe	Trp	Val	Gly	Val	Phe	Leu	Val	Val		
				245					250					255			
tgc	ctg	gcc	ggc	ctc	gcc	gtc	ggc	gcc	ctg	ctg	ctc	gcc	ggc	ccg	atc	816	
Cys	Leu	Ala	Gly	Leu	Ala	Val	Gly	Ala	Leu	Leu	Leu	Ala	Gly	Pro	Ile		
			260					265					270				
ctc	acc	gac	gcc	ggg	ctc	acg	gtc									840	
Leu	Thr	Asp	Ala	Gly	Leu	Thr	Val										
		275					280										

<210> 192

<211> 280

<212> PRT

<213> Micromonospora carbonacea

<220>

<223> ORF5

<400> 192

Val	Arg	Pro	Gly	Ala	Gly	Arg	Pro	Gly	Pro	Gly	Arg	Ala	Pro	Arg	Pro
1				5				10					15		

Trp Arg Ala Arg Gly Ala Arg Thr Gly Pro Gly Pro Leu Gly Cys Gly

20					25					30					
Pro	Val	Asp	Leu	Ile	Asp	Gly	Leu	Ser	Val	Val	Trp	Asn	Glu	Leu	Val
		35					40					45			
Gly	Ala	Gln	Pro	Asp	Pro	Pro	Pro	Leu	Leu	Val	Leu	Ala	Thr	Ala	Ala
	50					55					60				
Val	Ala	Leu	Ala	Val	Val	Ala	Thr	Arg	Val	Pro	Trp	Arg	Val	Ala	Arg
65					70					75					80
Asn	Ala	Val	Thr	Ile	Ala	His	Glu	Gly	Gly	His	Ala	Leu	Ala	Ala	Leu
				85					90						95
Leu	Thr	Gly	Arg	Lys	Leu	Arg	Gly	Ile	Arg	Leu	His	Ser	Asp	Thr	Ser
			100					105					110		
Gly	Leu	Thr	Leu	Ser	Ala	Gly	Arg	Pro	Thr	Gly	Leu	Gly	Met	Ile	Leu
		115					120					125			
Thr	Leu	Phe	Ala	Gly	Tyr	Val	Ala	Pro	Thr	Leu	Leu	Gly	Leu	Ala	Gly
	130					135						140			
Ala	Trp	Leu	Leu	Ala	Gly	Asn	Arg	Ile	Thr	Met	Leu	Leu	Ser	Val	Thr
145					150					155					160
Val	Val	Leu	Leu	Leu	Ala	Met	Leu	Ala	Met	Ile	Arg	Asn	Val	Tyr	Gly
				165				170						175	
Ala	Leu	Ser	Leu	Leu	Ala	Thr	Gly	Gly	Leu	Val	Phe	Ala	Val	Ser	Trp
			180					185					190		
Tyr	Ala	Pro	Pro	Gln	Val	Gln	Ala	Ala	Phe	Ala	Trp	Thr	Ser	Val	Trp
		195					200					205			
Phe	Leu	Leu	Phe	Gly	Gly	Val	Arg	Pro	Val	Ile	Glu	Leu	Gln	Arg	Leu
	210					215					220				
Arg	Ser	Arg	Gly	Arg	Met	Pro	Glu	Ser	Asp	Ala	Asp	Gln	Leu	Ala	Arg
225					230					235					240
Leu	Thr	Pro	Phe	Pro	Pro	Leu	Phe	Trp	Val	Gly	Val	Phe	Leu	Val	Val
				245					250					255	
Cys	Leu	Ala	Gly	Leu	Ala	Val	Gly	Ala	Leu	Leu	Leu	Ala	Gly	Pro	Ile
			260					265					270		
Leu	Thr	Asp	Ala	Gly	Leu	Thr	Val								
		275					280								

<210> 193
 <211> 753
 <212> DNA
 <213> Micromonospora carbonacea

<220>
 <221> CDS
 <222> (1) .. (753)

<220>
 <223> ORF6

<400> 193

gtg Val 1	act Thr	tac Tyr	cgg Arg	cac His 5	gaa Glu	acc Thr	gta Val	cgc Arg	ggg Gly 10	gcg Ala	tac Tyr	ggc Gly	gac Asp 15	ctg Leu	gcc Ala	48
agt Ser	ggc Gly	gcc Ala	gtg Val 20	ttg Leu	cgc Arg	tcg Ser	gcg Ala	ccg Pro 25	ggc Gly	ttc Phe	ccg Pro	gcg Ala	ttc Phe 30	ccg Pro	gtg Val	96
cgg Arg	ctc Leu	gcc Ala 35	tcc Ser	gag Glu	gtc Val	ctg Leu	caa Gln 40	acc Thr	gcg Ala	ctg Leu	gag Glu	ttg Leu 45	cgc Arg	ccg Pro	acg Thr	144
tcc Ser 50	gcc Ala	ccg Pro	gcc Ala	acc Thr	gtc Val	tgg Trp 55	gac Asp	ccg Pro	tgc Cys	tgc Cys	ggc Gly 60	agc Ser	ggc Gly	tac Tyr	ctg Leu	192
ctg Leu 65	acg Thr	gtg Val	ctc Leu	gcg Ala	ctg Leu 70	ctg Leu	cac His	cgg Arg	ccg Pro	agc Ser 75	ctt Leu	gcc Ala	ggg Gly	ctg Leu 80	ctc Leu	240
gcc Ala	tcc Ser	gac Asp	gtc Val	gac Asp 85	gag Glu	gcg Ala	gcc Ala	ctc Leu	gac Asp 90	ctt Leu	gct Ala	cgg Arg	gcc Ala	aac Asn 95	ctc Leu	288
ggc Gly	ctg Leu	ctg Leu	acc Thr 100	ggc Gly	gcc Ala	ggg Gly	ctc Leu	gac Asp 105	acg Thr	cgg Arg	gcc Ala	cgc Arg	gag Glu 110	ctg Leu	gcg Ala	336
caa Gln	cgc Arg	gcc Ala 115	gag Glu	gcg Ala	ttc Phe	gac Asp	aag Lys 120	ccg Pro	cac His	tac Tyr	gcg Ala	gag Glu 125	gcg Ala	gcc Ala	gcc Ala	384
gcc Ala 130	gcc Ala	cac His	cgg Arg	ctg Leu	cgc Arg	gcc Ala 135	cgt Arg	ctg Leu	gac Asp	gcg Ala	gca Ala 140	ggc Gly	ggc Gly	ccg Pro	ctg Leu	432
ccg Pro 145	tac Tyr	gcg Ala	gtg Val	cgg Arg	cgg Arg	gcc Ala	gac Asp	gtg Val	ttc Phe	gac Asp 155	cgc Arg	gtg Val	gcc Ala	ctc Leu	acc Thr 160	480
gag Glu	gcc Ala	gtc Val	gcg Ala	ggc Gly 165	atg Met	acc Thr	ccc Pro	gac Asp	ctg Leu 170	gtc Val	gtg Val	acc Thr	gac Asp	ctg Leu 175	ccg Pro	528
tac Tyr	ggg Gly	gag Glu	cag Gln 180	acg Thr	agc Ser	tgg Trp	cag Gln 185	ggg Gly	gag Glu	cgg Arg	gcc Ala	ggg Gly	gag Glu 190	ggc Gly	ctg Leu	576
ccc Pro	ggg Gly	atg Met 195	ctg Leu	acc Thr	agg Arg	gtc Val	gct Ala 200	tcc Ser	gtg Val	ctg Leu	ccg Pro	ccg Pro	acc Thr	ggg Gly	gtg Val	624
ctc Leu 210	gcc Ala	gtg Val	gtc Val	cta Leu	cgt Arg	gga Gly 215	cgc Arg	aag Lys	gtg Val	ccg Pro	ccg Pro	gtc Val	ggg Gly	gag Glu	gtc Val	672
cgc Arg 225	cct Pro	cgg Arg	cgg Arg	cgg Arg	ttg Leu 230	cgg Arg	gtg Val	ggc Gly	acc Thr	aga Arg 235	gcg Ala	gcg Ala	gcc Ala	ttc Phe	ttc Phe 240	720
gtc Val	gca Ala	ggc Gly	gac Asp	ctg Leu 245	acc Thr	ggg Gly	gtg Val	ccc Pro	gcg Ala 250	acc Thr						753

<210> 194
 <211> 251
 <212> PRT
 <213> Micromonospora carbonacea

<220>
 <223> ORF6

<400> 194
 Val Thr Tyr Arg His Glu Thr Val Arg Gly Ala Tyr Gly Asp Leu Ala
 1 5 10 15
 Ser Gly Ala Val Leu Arg Ser Ala Pro Gly Phe Pro Ala Phe Pro Val
 20 25 30
 Arg Leu Ala Ser Glu Val Leu Gln Thr Ala Leu Glu Leu Arg Pro Thr
 35 40 45
 Ser Ala Pro Ala Thr Val Trp Asp Pro Cys Cys Gly Ser Gly Tyr Leu
 50 55 60
 Leu Thr Val Leu Ala Leu Leu His Arg Pro Ser Leu Ala Gly Leu Leu
 65 70 75 80
 Ala Ser Asp Val Asp Glu Ala Ala Leu Asp Leu Ala Arg Ala Asn Leu
 85 90 95
 Gly Leu Leu Thr Gly Ala Gly Leu Asp Thr Arg Ala Arg Glu Leu Ala
 100 105 110
 Gln Arg Ala Glu Ala Phe Asp Lys Pro His Tyr Ala Glu Ala Ala Ala
 115 120 125
 Ala Ala His Arg Leu Arg Ala Arg Leu Asp Ala Ala Gly Gly Pro Leu
 130 135 140
 Pro Tyr Ala Val Arg Arg Ala Asp Val Phe Asp Arg Val Ala Leu Thr
 145 150 155 160
 Glu Ala Val Ala Gly Met Thr Pro Asp Leu Val Val Thr Asp Leu Pro
 165 170 175
 Tyr Gly Glu Gln Thr Ser Trp Gln Gly Glu Arg Ala Gly Glu Gly Leu
 180 185 190
 Pro Gly Met Leu Thr Arg Val Ala Ser Val Leu Pro Pro Thr Gly Val
 195 200 205
 Leu Ala Val Val Leu Arg Gly Arg Lys Val Pro Pro Val Gly Glu Val
 210 215 220
 Arg Pro Arg Arg Arg Leu Arg Val Gly Thr Arg Ala Ala Ala Phe Phe
 225 230 235 240
 Val Ala Gly Asp Leu Thr Gly Val Pro Ala Thr
 245 250

<210> 195
 <211> 1086
 <212> DNA
 <213> Micromonospora carbonacea

<220>

<221> CDS

<222> (1)..(1086)

<220>

<223> ORF7

<400> 195

atg acc gtc ccg gac acg gac gag cgg gcc acg acg acc gac gag ccc	48
Met Thr Val Pro Asp Thr Asp Glu Arg Ala Thr Thr Thr Asp Glu Pro	
1 5 10 15	
agc gcc cgc cgg gcg cag acc ggc gcg gac gcc gcc tgg ccg gag ctg	96
Ser Ala Arg Arg Ala Gln Thr Gly Ala Asp Ala Ala Trp Pro Glu Leu	
20 25 30	
atg cgg ttg gtg ttc ggc ggg atg gcc agc cgg ctg gtc ggc tac tgc	144
Met Arg Leu Val Phe Gly Gly Met Ala Ser Arg Leu Val Gly Tyr Cys	
35 40 45	
gtc cgg ctg ggg ctg ccc gac gcg atc ggc gac gac gag cgc acc ccg	192
Val Arg Leu Gly Leu Pro Asp Ala Ile Gly Asp Asp Glu Arg Thr Pro	
50 55 60	
cag gag ttg gcg ctg cgg tac gac gcc cga gcg gac acc atg ttc cgg	240
Gln Glu Leu Ala Leu Arg Tyr Asp Ala Arg Ala Asp Thr Met Phe Arg	
65 70 75 80	
gtg ctg cgc gcc ctg gcc gcg ctg cgg gtg ctc acc gag acc aca ccc	288
Val Leu Arg Ala Leu Ala Ala Leu Arg Val Leu Thr Glu Thr Thr Pro	
85 90 95	
ggc cgg ttc gcg ctc gcc ccg atg ggg gcg ctg ctg cgt ggg gac cga	336
Gly Arg Phe Ala Leu Ala Pro Met Gly Ala Leu Leu Arg Gly Asp Arg	
100 105 110	
ccc ggc acg ctg cgc ccg ctg gcc cgg atg ctg acc gac ccg gcc atg	384
Pro Gly Thr Leu Arg Pro Leu Ala Arg Met Leu Thr Asp Pro Ala Met	
115 120 125	
acc acg gcc tgg gac ggc ctg gcg cac agc gtc cgc acc ggc gag ccg	432
Thr Thr Ala Trp Asp Gly Leu Ala His Ser Val Arg Thr Gly Glu Pro	
130 135 140	
gcc ttc gac ggc atc ttc ggc acc gac ttc ttc agc tac gtg ggc ggg	480
Ala Phe Asp Gly Ile Phe Gly Thr Asp Phe Phe Ser Tyr Val Gly Gly	
145 150 155 160	
cga ccc gac ctt tcc gag ctg tac aac gcg gcg atg agc cag gtg acc	528
Arg Pro Asp Leu Ser Glu Leu Tyr Asn Ala Ala Met Ser Gln Val Thr	
165 170 175	
cac agc gtc gcg gcg gcc gtt gcc gag cgt acc gac ctg gcc ggc gtg	576
His Ser Val Ala Ala Ala Val Ala Glu Arg Thr Asp Leu Ala Gly Val	
180 185 190	
cgg acg gtg gtc gac gtg ggc ggc gga gac ggc acc ctg ctg gcc gcc	624
Arg Thr Val Val Asp Val Gly Gly Gly Asp Gly Thr Leu Leu Ala Ala	
195 200 205	
gtg ctc gcc gcg aac ccc ggc gtg cgg ggc gtg ctc tac gac agc gcc	672
Val Leu Ala Ala Asn Pro Gly Val Arg Gly Val Leu Tyr Asp Ser Ala	
210 215 220	
agc ggc agc gcg gag gcg gcg ggg aac ctg cgc cgc gcc ggg gtc ggc	720
Ser Gly Ser Ala Glu Ala Ala Gly Asn Leu Arg Arg Ala Gly Val Gly	

225	230	235	240	
gac cgg tgc cgg atc gag gtg ggt gac ttc ttc gag agg gtc ccc gcc	768			
Asp Arg Cys Arg Ile Glu Val Gly Asp Phe Phe Glu Arg Val Pro Ala				
245 250 255				
gac gcc gac ctc tac ctg ctc aaa agt gtg atc cac ggt tgg ggc gac	816			
Asp Ala Asp Leu Tyr Leu Leu Lys Ser Val Ile His Gly Trp Gly Asp				
260 265 270				
ggc cgg gcg acg gga atc ctc cgg cac tgt gcc gag gcg gtc gcc ccg	864			
Gly Arg Ala Thr Gly Ile Leu Arg His Cys Ala Glu Ala Val Ala Pro				
275 280 285				
ggc ggc cgg atc gtc atg atc gac cac gtg ctg ccg gac gtg gtc ggc	912			
Gly Gly Arg Ile Val Met Ile Asp His Val Leu Pro Asp Val Val Gly				
290 295 300				
ccg gcg gcc aac gcg ctg gcg tac ctg acc gac gtg ggg atg ctg gtc	960			
Pro Ala Ala Asn Ala Leu Ala Tyr Leu Thr Asp Val Gly Met Leu Val				
305 310 315 320				
aac ggg cag ggc ctg gag cgg acc cga ggc gac ctg gaa cgg ctg tgc	1008			
Asn Gly Gln Gly Leu Glu Arg Thr Arg Gly Asp Leu Glu Arg Leu Cys				
325 330 335				
ggc aag gcg ggg ctg tcc ctg gag gac gtc acg ccg ctg cct ccc acc	1056			
Gly Lys Ala Gly Leu Ser Leu Glu Asp Val Thr Pro Leu Pro Pro Thr				
340 345 350				
gac ttc cac tgg atc gag tcc cgg cct gcc	1086			
Asp Phe His Trp Ile Glu Ser Arg Pro Ala				
355 360				

<210> 196

<211> 362

<212> PRT

<213> Micromonospora carbonacea

<220>

<223> ORF7

<400> 196

Met Thr Val Pro Asp Thr Asp Glu Arg Ala Thr Thr Thr Asp Glu Pro
1 5 10 15

Ser Ala Arg Arg Ala Gln Thr Gly Ala Asp Ala Ala Trp Pro Glu Leu
20 25 30

Met Arg Leu Val Phe Gly Gly Met Ala Ser Arg Leu Val Gly Tyr Cys
35 40 45

Val Arg Leu Gly Leu Pro Asp Ala Ile Gly Asp Asp Glu Arg Thr Pro
50 55 60

Gln Glu Leu Ala Leu Arg Tyr Asp Ala Arg Ala Asp Thr Met Phe Arg
65 70 75 80

Val Leu Arg Ala Leu Ala Ala Leu Arg Val Leu Thr Glu Thr Thr Pro
85 90 95

Gly Arg Phe Ala Leu Ala Pro Met Gly Ala Leu Leu Arg Gly Asp Arg
100 105 110

Pro Gly Thr Leu Arg Pro Leu Ala Arg Met Leu Thr Asp Pro Ala Met
 115 120 125
 Thr Thr Ala Trp Asp Gly Leu Ala His Ser Val Arg Thr Gly Glu Pro
 130 135 140
 Ala Phe Asp Gly Ile Phe Gly Thr Asp Phe Phe Ser Tyr Val Gly Gly
 145 150 155 160
 Arg Pro Asp Leu Ser Glu Leu Tyr Asn Ala Ala Met Ser Gln Val Thr
 165 170 175
 His Ser Val Ala Ala Ala Val Ala Glu Arg Thr Asp Leu Ala Gly Val
 180 185 190
 Arg Thr Val Val Asp Val Gly Gly Gly Asp Gly Thr Leu Leu Ala Ala
 195 200 205
 Val Leu Ala Ala Asn Pro Gly Val Arg Gly Val Leu Tyr Asp Ser Ala
 210 215 220
 Ser Gly Ser Ala Glu Ala Ala Gly Asn Leu Arg Arg Ala Gly Val Gly
 225 230 235 240
 Asp Arg Cys Arg Ile Glu Val Gly Asp Phe Phe Glu Arg Val Pro Ala
 245 250 255
 Asp Ala Asp Leu Tyr Leu Leu Lys Ser Val Ile His Gly Trp Gly Asp
 260 265 270
 Gly Arg Ala Thr Gly Ile Leu Arg His Cys Ala Glu Ala Val Ala Pro
 275 280 285
 Gly Gly Arg Ile Val Met Ile Asp His Val Leu Pro Asp Val Val Gly
 290 295 300
 Pro Ala Ala Asn Ala Leu Ala Tyr Leu Thr Asp Val Gly Met Leu Val
 305 310 315 320
 Asn Gly Gln Gly Leu Glu Arg Thr Arg Gly Asp Leu Glu Arg Leu Cys
 325 330 335
 Gly Lys Ala Gly Leu Ser Leu Glu Asp Val Thr Pro Leu Pro Pro Thr
 340 345 350
 Asp Phe His Trp Ile Glu Ser Arg Pro Ala
 355 360

<210> 197
 <211> 852
 <212> DNA
 <213> Micromonospora carbonacea

<220>
 <221> CDS
 <222> (1)..(852)

<220>
 <223> ORF8

<400> 197
 atg agc gcc cag gtc ctc agc gac gag cag gtc gag cgg ttc gtc tcc 48
 Met Ser Ala Gln Val Leu Ser Asp Glu Gln Val Glu Arg Phe Val Ser

1			5			10			15							
gac Asp	ggg Gly	ttc Phe	gtg Val 20	aag Lys	ttg Leu	gag Glu	gcg Ala	gcg Ala 25	ttc Phe	ccg Pro	gcc Ala	gag Glu	ctc Leu 30	gcg Ala	cag Gln	96
cag Gln	ggt Gly	cgc Arg 35	gaa Glu	ctg Leu	ctg Leu	tgg Trp	cgg Arg 40	caa Gln	ctc Leu	ggc Gly	atg Met 45	gac Asp	ccc Pro	gag Glu	gac Asp	144
cgg Arg	agc Ser 50	acc Thr	tgg Trp	tcc Ser	cgc Arg	gag Glu 55	gtg Val	gtc Val	cgg Arg	ctg Leu	ggc Gly 60	ctc Leu	cag Gln	gac Asp	gcc Ala	192
gag Glu 65	ccc Pro	ttc Phe	gtg Val	cgc Arg	agc Ser 70	gcc Ala	acc Thr	acg Thr	ccc Pro	cgg Arg 75	ctg Leu	cac His	gcc Ala	gcc Ala	ttc Phe 80	240
gac Asp	cag Gln	ctc Leu	gtc Val 85	ggg Gly 85	gtg Val	ggg Gly	cgc Arg	tgg Trp	aag Lys 90	ccg Pro	ttg Leu	gac Asp	cgg Arg	atc Ile 95	ggc Gly	288
acc Thr	ttc Phe	ccg Pro	gtc Val 100	cgg Arg	ttc Phe	ccg Pro	gtg Val	ccc Pro 105	aag Lys	cgc Arg	ccg Pro	gag Glu	cag Gln 110	acc Thr	gag Glu	336
gac Asp	tac Tyr	ggc Gly 115	tgg Trp	cac His	atc Ile	gac Asp	gcc Ala 120	agt Ser	ttc Phe	ctg Leu	gcc Ala	gac Asp 125	gac Asp	gcg Ala	cag Gln	384
cgg Arg 130	ctg Leu	ggc Gly	ccc Pro	cag Gln	aac Asn	tgg Trp 135	gag Glu	ggc Gly	gag Glu	ctg Leu	gac Asp 140	ctg Leu	gtc Val	ccg Pro	ccc Pro	432
aac Asn 145	tac Tyr	gcg Ala	gag Glu	gtc Val	ttc Phe 150	cgc Arg	tgc Cys	aac Asn	ctc Leu	cgg Arg 155	tcg Ser	cgg Arg	ggg Gly	cgg Arg	gcc Ala 160	480
ctg Leu	ctg Leu	ctg Leu	ctg Leu 165	ttc Phe 165	ctc Leu	ttc Phe	tcc Ser	gac Asp 170	acc Thr	gac Asp	gag Glu	cgg Arg	gag Glu 175	gcg Ala	ccg Pro	528
acg Thr	ctg Leu	gtc Val 180	agg Arg	gtc Val	ggc Gly	tcc Ser	cac His	ctg Leu 185	gac Asp	gtg Val	ccg Pro	ccg Pro	ctg Leu 190	ctc Leu	gaa Glu	576
ccg Pro	tac Tyr	ggc Gly 195	ccg Pro	gag Glu	ggc Gly	acc Thr 200	tac Tyr	ctc Leu	gac Asp	gtg Val	ggc Gly 205	gac Asp	gtc Val	ggc Gly	cgg Arg	624
gac Asp 210	cgc Arg	ccg Pro	ctc Leu	gcc Ala	tcc Ser 215	gcc Ala	acc Thr	gga Gly	cgc Arg	gcc Ala	ggt Gly 220	gac Asp	gtc Val	tac Tyr	ctg Leu	672
tgc Cys 225	cac His	ccg Pro	ttc Phe	ctg Leu	gtg Val 230	cac His	acc Thr	ccg Pro	gtg Val	gcc Ala 235	aac Asn	acc Thr	ggc Gly	acg Thr	cgg Arg 240	720
ccc Pro	cgg Arg	ttc Phe	atg Met 245	gcc Ala 245	cag Gln	ccg Pro	agc Ser	ctg Leu	cag Gln 250	ccg Pro	gtg Val	ggc Gly	gag Glu	ctg Leu 255	gac Asp	768
ctg Leu	gac Asp	cgc Arg	ccg Pro 260	gac Asp	ggc Gly	gac Asp	tac Tyr 265	tcg Ser	ccg Pro	gtc Val	gaa Glu	cgg Arg	gcc Ala 270	gtg Val	cgc Arg	816

atc ggg ctg ggc ctg ccg gcc gcc gag ccg gtc cga
 Ile Gly Leu Gly Leu Pro Ala Ala Glu Pro Val Arg
 275 280

852

<210> 198
 <211> 284
 <212> PRT
 <213> Micromonospora carbonacea

<220>
 <223> ORF8

<400> 198
 Met Ser Ala Gln Val Leu Ser Asp Glu Gln Val Glu Arg Phe Val Ser
 1 5 10 15
 Asp Gly Phe Val Lys Leu Glu Ala Ala Phe Pro Ala Glu Leu Ala Gln
 20 25 30
 Gln Gly Arg Glu Leu Leu Trp Arg Gln Leu Gly Met Asp Pro Glu Asp
 35 40 45
 Arg Ser Thr Trp Ser Arg Glu Val Val Arg Leu Gly Leu Gln Asp Ala
 50 55 60
 Glu Pro Phe Val Arg Ser Ala Thr Thr Pro Arg Leu His Ala Ala Phe
 65 70 75 80
 Asp Gln Leu Val Gly Val Gly Arg Trp Lys Pro Leu Asp Arg Ile Gly
 85 90 95
 Thr Phe Pro Val Arg Phe Pro Val Pro Lys Arg Pro Glu Gln Thr Glu
 100 105 110
 Asp Tyr Gly Trp His Ile Asp Ala Ser Phe Leu Ala Asp Asp Ala Gln
 115 120 125
 Arg Leu Gly Pro Gln Asn Trp Glu Gly Glu Leu Asp Leu Val Pro Pro
 130 135 140
 Asn Tyr Ala Glu Val Phe Arg Cys Asn Leu Arg Ser Arg Gly Arg Ala
 145 150 155 160
 Leu Leu Leu Leu Phe Leu Phe Ser Asp Thr Asp Glu Arg Glu Ala Pro
 165 170 175
 Thr Leu Val Arg Val Gly Ser His Leu Asp Val Pro Pro Leu Leu Glu
 180 185 190
 Pro Tyr Gly Pro Glu Gly Thr Tyr Leu Asp Val Gly Asp Val Gly Arg
 195 200 205
 Asp Arg Pro Leu Ala Ser Ala Thr Gly Arg Ala Gly Asp Val Tyr Leu
 210 215 220
 Cys His Pro Phe Leu Val His Thr Pro Val Ala Asn Thr Gly Thr Arg
 225 230 235 240
 Pro Arg Phe Met Ala Gln Pro Ser Leu Gln Pro Val Gly Glu Leu Asp
 245 250 255
 Leu Asp Arg Pro Asp Gly Asp Tyr Ser Pro Val Glu Arg Ala Val Arg
 260 265 270

Ile Gly Leu Gly Leu Pro Ala Ala Glu Pro Val Arg
 275 280

<210> 199
 <211> 1062
 <212> DNA
 <213> *Micromonospora carbonacea*

<220>
 <221> CDS
 <222> (1)..(1062)

<220>
 <223> ORF9

<400> 199
 gtg gag tac cga cag ttg ggc cgg tgt gga ctg cgg gtg tcc aag gtg 48
 Val Glu Tyr Arg Gln Leu Gly Arg Cys Gly Leu Arg Val Ser Lys Val
 1 5 10 15
 tcc ctg ggg gcg ttc aac ttc ggc ggc ccg acc ggg ccg gag gag gcc 96
 Ser Leu Gly Ala Phe Asn Phe Gly Gly Pro Thr Gly Pro Glu Glu Ala
 20 25 30
 gcc agg atc gtc gcc acg gcc gtc gaa gcg gga gtc aac ctc gtc gac 144
 Ala Arg Ile Val Ala Thr Ala Val Glu Ala Gly Val Asn Leu Val Asp
 35 40 45
 acg gcc aac gtc tac cag gac ggc cgc agc gag gag atc gtc ggc gcg 192
 Thr Ala Asn Val Tyr Gln Asp Gly Arg Ser Glu Glu Ile Val Gly Ala
 50 55 60
 gcc gtg cgg agc tgc cgg gac gac gtc ctg ctg gcc acc aag atc ttc 240
 Ala Val Arg Ser Cys Arg Asp Asp Val Leu Leu Ala Thr Lys Ile Phe
 65 70 75 80
 aat ccg gtc ggc ccg gga ccg aac gac cgg ggc acc tcg gcg tac gcc 288
 Asn Pro Val Gly Pro Gly Pro Asn Asp Arg Gly Thr Ser Ala Tyr Ala
 85 90 95
 ctg aag cgg gag tgc gag cgg tcg ttg cgc cgg ctg ggt acc gac cac 336
 Leu Lys Arg Glu Cys Glu Arg Ser Leu Arg Arg Leu Gly Thr Asp His
 100 105 110
 atc gac ctg ctc tac ctg cac cgt cac gac ccg gac act ccg gtg gag 384
 Ile Asp Leu Leu Tyr Leu His Arg His Asp Pro Asp Thr Pro Val Glu
 115 120 125
 gag acg gtg tcc gcc ctc gac gac ctg gtc cgc tcg ggc aag gtc cgc 432
 Glu Thr Val Ser Ala Leu Asp Asp Leu Val Arg Ser Gly Lys Val Arg
 130 135 140
 tac gtg ggc acc tcc acc gtg ccc acg gca tac gag ctg gcc gac cag 480
 Tyr Val Gly Thr Ser Thr Val Pro Thr Ala Tyr Glu Leu Ala Asp Gln
 145 150 155 160
 ccc cgg ctg ggc acg gtg ccc agc tgg cgg atc gtc gac ctg ctg cgc 528
 Pro Arg Leu Gly Thr Val Pro Ser Trp Arg Ile Val Asp Leu Leu Arg
 165 170 175
 acg gcg cag tcc cgg ggc gcc gcc ccg gtg gtg gcc gag cag tcg ccg 576
 Thr Ala Gln Ser Arg Gly Ala Ala Pro Val Val Ala Glu Gln Ser Pro

180										185					190					
tac	aac	ctg	ctg	gaa	cgc	gag	atc	gag	cgg	gac	gtg	ctg	ccg	ctg	tgc	624				
Tyr	Asn	Leu	Leu	Glu	Arg	Glu	Ile	Glu	Arg	Asp	Val	Leu	Pro	Leu	Cys					
		195					200					205								
gcg	gag	tac	ggc	ctc	ggc	ctg	ttc	acc	tac	agc	ccg	ctg	gcg	atg	ggc	672				
Ala	Glu	Tyr	Gly	Leu	Gly	Leu	Phe	Thr	Tyr	Ser	Pro	Leu	Ala	Met	Gly					
	210					215					220									
ctg	ctc	tcc	gac	cgg	ttc	gcc	gac	ggc	gag	ccg	ccc	cgc	gac	gcc	cgg	720				
Leu	Leu	Ser	Asp	Arg	Phe	Ala	Asp	Gly	Glu	Pro	Pro	Arg	Asp	Ala	Arg					
225					230					235					240					
ttc	acc	gcc	tgg	tac	gcc	cca	tcg	ggc	ccg	cac	tgg	cag	ccg	gtg	tgg	768				
Phe	Thr	Ala	Trp	Tyr	Ala	Pro	Ser	Gly	Pro	His	Trp	Gln	Pro	Val	Trp					
				245					250					255						
cgg	acc	ctg	ggc	cgg	ttg	gcg	aag	gtg	gcc	gtc	gag	ctg	ggc	ctg	tcc	816				
Arg	Thr	Leu	Gly	Arg	Leu	Ala	Lys	Val	Ala	Val	Glu	Leu	Gly	Leu	Ser					
			260					265					270							
ctg	ccg	gac	ctg	gcg	cac	gcc	tgg	gtc	tac	gac	gcg	ccg	ggg	gtg	acc	864				
Leu	Pro	Asp	Leu	Ala	His	Ala	Trp	Val	Tyr	Asp	Ala	Pro	Gly	Val	Thr					
		275					280					285								
agc	acg	gtc	gtc	ggc	ccc	cgc	acg	ctg	gac	cag	gcc	cgg	gcg	gcg	ctg	912				
Ser	Thr	Val	Val	Gly	Pro	Arg	Thr	Leu	Asp	Gln	Ala	Arg	Ala	Ala	Leu					
	290					295					300									
gcg	gcg	gcc	gac	cgg	ccg	ctg	ccg	gag	gag	gcc	cgc	gcc	cgg	ctc	gac	960				
Ala	Ala	Ala	Asp	Arg	Pro	Leu	Pro	Glu	Glu	Ala	Arg	Ala	Arg	Leu	Asp					
305					310					315					320					
ggc	atc	gcc	gca	ccc	ggg	gag	agc	cga	tgg	ttg	cgg	gtg	gtg	gag	cgg	1008				
Gly	Ile	Ala	Ala	Pro	Gly	Glu	Ser	Arg	Trp	Leu	Arg	Val	Val	Glu	Arg					
				325					330					335						
ggg	gtg	cgg	cgc	tct	cgc	ggt	ggc	ccg	gac	gat	gct	gag	gaa	aac	gtt	1056				
Gly	Val	Arg	Arg	Ser	Arg	Gly	Gly	Pro	Asp	Asp	Ala	Glu	Glu	Asn	Val					
			340					345					350							
agt	ccc															1062				
Ser	Pro																			

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<211> 354

<212> PRT

<213> Micromonospora carbonacea

<220>

<223> ORF9

<400> 200

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Ser	Leu	Gly	Ala	Phe	Asn	Phe	Gly	Gly	Pro	Thr	Gly	Pro	Glu	Glu	Ala
			20					25					30		

Ala	Arg	Ile	Val	Ala	Thr	Ala	Val	Glu	Ala	Gly	Val	Asn	Leu	Val	Asp
		35					40					45			

Thr	Ala	Asn	Val	Tyr	Gln	Asp	Gly	Arg	Ser	Glu	Glu	Ile	Val	Gly	Ala
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

50		55		60												
Ala	Val	Arg	Ser	Cys	Arg	Asp	Asp	Val	Leu	Leu	Ala	Thr	Lys	Ile	Phe	
65					70					75					80	
Asn	Pro	Val	Gly	Pro	Gly	Pro	Asn	Asp	Arg	Gly	Thr	Ser	Ala	Tyr	Ala	
			85						90					95		
Leu	Lys	Arg	Glu	Cys	Glu	Arg	Ser	Leu	Arg	Arg	Leu	Gly	Thr	Asp	His	
			100					105					110			
Ile	Asp	Leu	Leu	Tyr	Leu	His	Arg	His	Asp	Pro	Asp	Thr	Pro	Val	Glu	
		115					120					125				
Glu	Thr	Val	Ser	Ala	Leu	Asp	Asp	Leu	Val	Arg	Ser	Gly	Lys	Val	Arg	
	130					135					140					
Tyr	Val	Gly	Thr	Ser	Thr	Val	Pro	Thr	Ala	Tyr	Glu	Leu	Ala	Asp	Gln	
145					150					155					160	
Pro	Arg	Leu	Gly	Thr	Val	Pro	Ser	Trp	Arg	Ile	Val	Asp	Leu	Leu	Arg	
			165					170					175			
Thr	Ala	Gln	Ser	Arg	Gly	Ala	Ala	Pro	Val	Val	Ala	Glu	Gln	Ser	Pro	
		180						185					190			
Tyr	Asn	Leu	Leu	Glu	Arg	Glu	Ile	Glu	Arg	Asp	Val	Leu	Pro	Leu	Cys	
		195				200						205				
Ala	Glu	Tyr	Gly	Leu	Gly	Leu	Phe	Thr	Tyr	Ser	Pro	Leu	Ala	Met	Gly	
	210					215					220					
Leu	Leu	Ser	Asp	Arg	Phe	Ala	Asp	Gly	Glu	Pro	Pro	Arg	Asp	Ala	Arg	
225					230					235					240	
Phe	Thr	Ala	Trp	Tyr	Ala	Pro	Ser	Gly	Pro	His	Trp	Gln	Pro	Val	Trp	
			245					250						255		
Arg	Thr	Leu	Gly	Arg	Leu	Ala	Lys	Val	Ala	Val	Glu	Leu	Gly	Leu	Ser	
			260					265					270			
Leu	Pro	Asp	Leu	Ala	His	Ala	Trp	Val	Tyr	Asp	Ala	Pro	Gly	Val	Thr	
		275					280					285				
Ser	Thr	Val	Val	Gly	Pro	Arg	Thr	Leu	Asp	Gln	Ala	Arg	Ala	Ala	Leu	
	290				295						300					
Ala	Ala	Ala	Asp	Arg	Pro	Leu	Pro	Glu	Glu	Ala	Arg	Ala	Arg	Leu	Asp	
305					310					315					320	
Gly	Ile	Ala	Ala	Pro	Gly	Glu	Ser	Arg	Trp	Leu	Arg	Val	Val	Glu	Arg	
			325						330					335		
Gly	Val	Arg	Arg	Ser	Arg	Gly	Gly	Pro	Asp	Asp	Ala	Glu	Glu	Asn	Val	
			340					345					350			

Ser Pro

<210> 201

<211> 927

<212> DNA

<213> Micromonospora carbonacea

<220>

<221> CDS

<222> (1)..(927)

<220>

<223> ORF10

<400> 201

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1 5 10 15	
aca cag gtg acc gag gag gcg gcg gac gac ctc acc tcc ttc aag tcg	96
Thr Gln Val Thr Glu Glu Ala Ala Asp Asp Leu Thr Ser Phe Lys Ser	
20 25 30	
agc gac gtc aac tac aag ctc gcc ctc tgg gat ccc cgg gtc agc ggg	144
Ser Asp Val Asn Tyr Lys Leu Ala Leu Trp Asp Pro Arg Val Ser Gly	
35 40 45	
gtc cgc tac ctg aag acg ctc atc ttc aac ctg gcc gag aac ctg ggc	192
Val Arg Tyr Leu Lys Thr Leu Ile Phe Asn Leu Ala Glu Asn Leu Gly	
50 55 60	
gag gcg aac cgg gcc cgg ttg cgc cgg atc gcc aac cgg gac gtc ggc	240
Glu Ala Asn Arg Ala Arg Leu Arg Arg Ile Ala Asn Arg Asp Val Gly	
65 70 75 80	
gac ccc atc tcc gtc gtc tgg gac ggc gac cgg atc tgc atg gac tat	288
Asp Pro Ile Ser Val Val Trp Asp Gly Asp Arg Ile Cys Met Asp Tyr	
85 90 95	
ctc cag gcg gtg ctg gag ctg gag ttc ttc tcc cgc cac gtg cca ctg	336
Leu Gln Ala Val Leu Glu Leu Glu Phe Phe Ser Arg His Val Pro Leu	
100 105 110	
gac ggc gcg acg gtg ctg gag atc ggc gcg ggc tac ggc cgc acc tgt	384
Asp Gly Ala Thr Val Leu Glu Ile Gly Ala Gly Tyr Gly Arg Thr Cys	
115 120 125	
cac gcc gtg ctc tcc aac cac gac gtc gcc gcg tac cac gtg gtc gac	432
His Ala Val Leu Ser Asn His Asp Val Ala Ala Tyr His Val Val Asp	
130 135 140	
ctg ccg aac tcc ctc gct ctg gcc cgc cgc tac ctg ggc acg gtg ctc	480
Leu Pro Asn Ser Leu Ala Leu Ala Arg Arg Tyr Leu Gly Thr Val Leu	
145 150 155 160	
acc gcc gag cag ttg gcg agg gtc cac ttc cac ggc gtc ggc gag gtg	528
Thr Ala Glu Gln Leu Ala Arg Val His Phe His Gly Val Gly Glu Val	
165 170 175	
gac ggg ccg ctg agc gag ctg cgc tac gac ctc gtg atc aac atc gac	576
Asp Gly Pro Leu Ser Glu Leu Arg Tyr Asp Leu Val Ile Asn Ile Asp	
180 185 190	
tcg ttc gcg gag atg acg gcg gag acg gtg cgc gcg tac ctc gcc ttc	624
Ser Phe Ala Glu Met Thr Ala Glu Thr Val Arg Ala Tyr Leu Ala Phe	
195 200 205	
gtc gcc acc agg gcc cgc cac ctg tac gtc aac aac ccc gtc ggg aag	672
Val Ala Thr Arg Ala Arg His Leu Tyr Val Asn Asn Pro Val Gly Lys	
210 215 220	
tac ctc gac aag agc ctg gac ggg cac ttc cag ggc gag gcc gtg gtc	720
Tyr Leu Asp Lys Ser Leu Asp Gly His Phe Gln Gly Glu Ala Val Val	

225	230	235	240	
aac ctt gcg ctg agc acc ggc ctg ctg cgc gac gtc atc gac atc cac				768
Asn Leu Ala Leu Ser Thr Gly Leu Leu Arg Asp Val Ile Asp Ile His				
	245	250	255	
gac aac cag gcc gtg cgg cgg cag tcc cgg gcg ttc ctc gac gcg tac				816
Asp Asn Gln Ala Val Arg Arg Gln Ser Arg Ala Phe Leu Asp Ala Tyr				
	260	265	270	
cgg ccg ggg ccg ggc tgg gcc tgc gtg gcg gag agc cgg acg atc ccg				864
Arg Pro Gly Pro Gly Trp Ala Cys Val Ala Glu Ser Arg Thr Ile Pro				
	275	280	285	
tgg agc tac tac tgg cag gcg ctc tac cgg gcc ggc gag gcg gcc ccg				912
Trp Ser Tyr Tyr Trp Gln Ala Leu Tyr Arg Ala Gly Glu Ala Ala Pro				
	290	295	300	
gca ccc ggg cgg gat				927
Ala Pro Gly Arg Asp				
305				

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<212> PRT

<213> Micromonospora carbonacea

<220>

<223> ORF10

<400> 202

Met Ser Asp Lys Tyr Gly Arg Ser Ala Leu Trp Glu Arg Tyr Asn Ser
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Thr Gln Val Thr Glu Glu Ala Ala Asp Asp Leu Thr Ser Phe Lys Ser
20 25 30

Ser Asp Val Asn Tyr Lys Leu Ala Leu Trp Asp Pro Arg Val Ser Gly
35 40 45

Val Arg Tyr Leu Lys Thr Leu Ile Phe Asn Leu Ala Glu Asn Leu Gly
50 55 60

Glu Ala Asn Arg Ala Arg Leu Arg Arg Ile Ala Asn Arg Asp Val Gly
65 70 75 80

Asp Pro Ile Ser Val Val Trp Asp Gly Asp Arg Ile Cys Met Asp Tyr
85 90 95

Leu Gln Ala Val Leu Glu Leu Glu Phe Phe Ser Arg His Val Pro Leu
100 105 110

Asp Gly Ala Thr Val Leu Glu Ile Gly Ala Gly Tyr Gly Arg Thr Cys
115 120 125

His Ala Val Leu Ser Asn His Asp Val Ala Ala Tyr His Val Val Asp
130 135 140

Leu Pro Asn Ser Leu Ala Leu Ala Arg Arg Tyr Leu Gly Thr Val Leu
145 150 155 160

Thr Ala Glu Gln Leu Ala Arg Val His Phe His Gly Val Gly Glu Val
165 170 175

Asp Gly Pro Leu Ser Glu Leu Arg Tyr Asp Leu Val Ile Asn Ile Asp
 180 185 190
 Ser Phe Ala Glu Met Thr Ala Glu Thr Val Arg Ala Tyr Leu Ala Phe
 195 200 205
 Val Ala Thr Arg Ala Arg His Leu Tyr Val Asn Asn Pro Val Gly Lys
 210 215 220
 Tyr Leu Asp Lys Ser Leu Asp Gly His Phe Gln Gly Glu Ala Val Val
 225 230 235 240
 Asn Leu Ala Leu Ser Thr Gly Leu Leu Arg Asp Val Ile Asp Ile His
 245 250 255
 Asp Asn Gln Ala Val Arg Arg Gln Ser Arg Ala Phe Leu Asp Ala Tyr
 260 265 270
 Arg Pro Gly Pro Gly Trp Ala Cys Val Ala Glu Ser Arg Thr Ile Pro
 275 280 285
 Trp Ser Tyr Tyr Trp Gln Ala Leu Tyr Arg Ala Gly Glu Ala Ala Pro
 290 295 300
 Ala Pro Gly Arg Asp
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<220>
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 <222> (1)..(999)

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 1 5 10 15
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 Arg Arg Ala Ala Val Leu Pro Ala Ala Pro Gly Arg Ala Ala Phe Glu
 20 25 30
 gtg gta cgg gcc gac ctg acc gac cgg gga gcc ctg gcg gcg gta 144
 Val Val Arg Ala Asp Leu Thr Asp Arg Gly Ala Leu Ala Ala Val
 35 40 45
 cgc gac gcg acg gcc gtg gtc aac ctc acc ctg gac agt tcc ggc tgg 192
 Arg Asp Ala Thr Ala Val Val Asn Leu Thr Leu Asp Ser Ser Gly Trp
 50 55 60
 cgg ggc gcc gac gac gac cgc agc gcg cgg gtc aac gtc gag ctg acc 240
 Arg Gly Ala Asp Asp Asp Arg Ser Ala Arg Val Asn Val Glu Leu Thr
 65 70 75 80
 cgg gaa ctc gtc ggg atg ctc cgc ccc ggg ccg ggc ggc acg ccc acc 288
 Arg Glu Leu Val Gly Met Leu Arg Pro Gly Pro Gly Gly Thr Pro Thr
 85 90 95
 aca ctg gtc ttc gcc ggc tcc gcc tcc cag gtg ggc cgg ccg ccc cgg 336

Thr	Leu	Val	Phe	Ala	Gly	Ser	Ala	Ser	Gln	Val	Gly	Arg	Pro	Pro	Arg	
			100					105					110			
atc	ccg	atc	gac	ggc	acc	gag	ccg	gac	cac	ccc	gcc	acc	ccg	tac	gac	384
Ile	Pro	Ile	Asp	Gly	Thr	Glu	Pro	Asp	His	Pro	Ala	Thr	Pro	Tyr	Asp	
		115					120					125				
cgg	cag	aag	cag	gcc	gcg	gag	tcg	ctg	gtc	gtg	gcg	gcc	acc	ggg	gcc	432
Arg	Gln	Lys	Gln	Ala	Ala	Glu	Ser	Leu	Val	Val	Ala	Ala	Thr	Gly	Ala	
	130					135					140					
ggc	gtc	gtg	aac	ggg	gtg	tcg	ctg	cga	ctg	ccc	acc	gtg	ttc	ggc	ccg	480
Gly	Val	Val	Asn	Gly	Val	Ser	Leu	Arg	Leu	Pro	Thr	Val	Phe	Gly	Pro	
145					150					155					160	
gtg	ccg	ccg	ggc	gcc	ggg	ccc	gac	cgg	ggc	gtg	gtg	tcc	acg	atg	atc	528
Val	Pro	Pro	Gly	Ala	Gly	Pro	Asp	Arg	Gly	Val	Val	Ser	Thr	Met	Ile	
			165					170						175		
cgc	cgg	gcg	ctg	tcc	gga	gcg	cca	ctg	acc	atg	tgg	cac	gac	ggc	cgg	576
Arg	Arg	Ala	Leu	Ser	Gly	Ala	Pro	Leu	Thr	Met	Trp	His	Asp	Gly	Arg	
			180					185					190			
gtg	caa	cgg	caa	ctg	ctg	tac	gtg	gcc	gac	gcc	gcc	gcc	gcc	ttc	gtg	624
Val	Gln	Arg	Gln	Leu	Leu	Tyr	Val	Ala	Asp	Ala	Ala	Ala	Ala	Phe	Val	
		195					200					205				
gcg	gcg	ctg	gac	cac	ccc	ggg	gcg	ctg	acc	ggc	cgg	cac	tgg	ccg	ctc	672
Ala	Ala	Leu	Asp	His	Pro	Gly	Ala	Leu	Thr	Gly	Arg	His	Trp	Pro	Leu	
	210					215					220					
ggc	gac	ggc	cgg	ggt	gaa	cgg	ctc	ggg	gac	ctg	ttc	cgc	gcc	atc	gcc	720
Gly	Asp	Gly	Arg	Gly	Glu	Arg	Leu	Gly	Asp	Leu	Phe	Arg	Ala	Ile	Ala	
225					230					235					240	
gcc	ctg	gtg	gcc	gag	cgg	acc	ggt	cgg	cca	ccg	gtg	ccg	gtg	ctg	gcc	768
Ala	Leu	Val	Ala	Glu	Arg	Thr	Gly	Arg	Pro	Pro	Val	Pro	Val	Leu	Ala	
			245					250						255		
gtg	ccc	ccg	ccc	gac	gag	gcc	cgg	gtc	agc	gac	ttc	cac	gac	atg	gtc	816
Val	Pro	Pro	Pro	Asp	Glu	Ala	Arg	Val	Ser	Asp	Phe	His	Asp	Met	Val	
			260					265					270			
gtt	gac	gcc	tcg	gcc	ttc	cag	gcg	gtc	acc	ggg	tgg	gcg	ccc	cgg	gtg	864
Val	Asp	Ala	Ser	Ala	Phe	Gln	Ala	Val	Thr	Gly	Trp	Ala	Pro	Arg	Val	
		275					280					285				
ccg	ttg	cgc	ctc	gcg	ctg	gac	cgc	acc	gtc	gcg	gcg	ctc	gcc	cgc	gac	912
Pro	Leu	Arg	Leu	Ala	Leu	Asp	Arg	Thr	Val	Ala	Ala	Leu	Ala	Arg	Asp	
	290					295					300					
gac	agc	ggc	ccc	gag	gcc	ccg	ggc	ggc	gtc	ggc	ccg	acg	cgg	gcg	gat	960
Asp	Ser	Gly	Pro	Glu	Ala	Pro	Gly	Gly	Val	Gly	Pro	Thr	Arg	Ala	Asp	
305					310					315					320	
cag	gcc	cgg	aag	ccg	gac	tcg	atc	tcc	agg	cag	gtc	cgg				999
Gln	Ala	Arg	Lys	Pro	Asp	Ser	Ile	Ser	Arg	Gln	Val	Arg				
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<211> 333

<212> PRT

<213> Micromonospora carbonacea

<220>

<223> ORF11

<400> 204

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Arg	Arg	Ala	Ala 20	Val	Leu	Pro	Ala	Ala 25	Pro	Gly	Arg	Ala	Ala 30	Phe	Glu
Val	Val	Arg 35	Ala	Asp	Leu	Thr	Asp 40	Arg	Gly	Ala	Leu	Ala 45	Ala	Ala	Val
Arg	Asp 50	Ala	Thr	Ala	Val	Val 55	Asn	Leu	Thr	Leu	Asp 60	Ser	Ser	Gly	Trp
Arg 65	Gly	Ala	Asp	Asp 70	Asp	Arg	Ser	Ala	Arg	Val 75	Asn	Val	Glu	Leu	Thr 80
Arg	Glu	Leu	Val	Gly 85	Met	Leu	Arg	Pro	Gly 90	Pro	Gly	Gly	Thr	Pro 95	Thr
Thr	Leu	Val	Phe 100	Ala	Gly	Ser	Ala	Ser 105	Gln	Val	Gly	Arg	Pro 110	Pro	Arg
Ile	Pro	Ile 115	Asp	Gly	Thr	Glu	Pro 120	Asp	His	Pro	Ala	Thr 125	Pro	Tyr	Asp
Arg	Gln 130	Lys	Gln	Ala	Ala	Glu 135	Ser	Leu	Val	Val	Ala 140	Ala	Thr	Gly	Ala
Gly 145	Val	Val	Asn	Gly 150	Val	Ser	Leu	Arg	Leu	Pro 155	Thr	Val	Phe	Gly	Pro 160
Val	Pro	Pro	Gly 165	Ala	Gly	Pro	Asp	Arg	Gly 170	Val	Val	Ser	Thr	Met 175	Ile
Arg	Arg	Ala	Leu 180	Ser	Gly	Ala	Pro	Leu 185	Thr	Met	Trp	His	Asp 190	Gly	Arg
Val	Gln 195	Arg	Gln	Leu	Leu	Tyr	Val 200	Ala	Asp	Ala	Ala	Ala 205	Ala	Phe	Val
Ala 210	Ala	Leu	Asp	His	Pro	Gly 215	Ala	Leu	Thr	Gly	Arg 220	His	Trp	Pro	Leu
Gly 225	Asp	Gly	Arg	Gly 230	Glu	Arg	Leu	Gly	Asp	Leu 235	Phe	Arg	Ala	Ile	Ala 240
Ala	Leu	Val	Ala	Glu 245	Arg	Thr	Gly	Arg	Pro 250	Pro	Val	Pro	Val	Leu 255	Ala
Val	Pro	Pro	Pro 260	Asp	Glu	Ala	Arg	Val 265	Ser	Asp	Phe	His	Asp 270	Met	Val
Val	Asp 275	Ala	Ser	Ala	Phe	Gln	Ala 280	Val	Thr	Gly	Trp	Ala 285	Pro	Arg	Val
Pro 290	Leu	Arg	Leu	Ala	Leu	Asp 295	Arg	Thr	Val	Ala	Ala 300	Leu	Ala	Arg	Asp
Asp 305	Ser	Gly	Pro	Glu 310	Ala	Pro	Gly	Gly	Val	Gly 315	Pro	Thr	Arg	Ala	Asp 320
Gln	Ala	Arg	Lys	Pro	Asp	Ser	Ile	Ser	Arg	Gln	Val	Arg			

340

325

330